# CONTENTS.

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## ART. I.—REMARKS ON THE REVISION OF THE PHARMACOPŒIA.

By William Procter, Jr.

Previous to the year 1820 the medical profession in the United States had no authorized pharmaceutical guide, and the apothecaries no generally recognized standard for the preparation of medicines. The Pharmacopœias of the British Colleges were more looked to than perhaps any other, and the fact that these works varied in many particulars in the strength of medicines, and their mode of preparation, aided by the adoption of the one or the other of them in different localities, or by different individuals in the same place, gave to the pharmacy of this country, prior to the period stated, an irregularity and uncertainty hardly now to be appreciated, and it is to be hoped never to be again realized. As the medical community of Great Britain are beginning to perceive the impropriety of having three guide books for the apothecary within limits so contracted, they will doubtless, ere long, by the adoption of a National Pharmacopœia, avoid the reproach, of which the existence of strong local prejudices have rendered them deserving, and have an uniform standard for their pharmaceutical preparations.

The wisdom exhibited by the gentlemen through whose exertions the first edition of our Pharmacopœia was projected, and its publication accomplished, is every year more verified, and the provision then adopted for the decennial revision of the work they had produced, is one of the marks of their forecast. Two successive revisions have been accomplished, which have brought the work, on the scores of scientific exactness and simplicity of diction and arrangement, to a degree of perfection which enables it to be compared successfully with any of the European standards.

Until recent times the preparation and revision of Pharmacopœias devolved solely upon the physician, and was kept entirely within the pale of the medical profession. The revision of the French Codex in 1837 was conducted by a mixed commission of eminent physicians and pharmaceutists, who, by acting conjointly in carrying out their duties, have impressed on the revised edition of that work a character for accuracy in practical detail, not enjoyed by its predecessor.

The National Convention of 1840, appreciating the important part which pharmaceutists were qualified to act in this revisional labour, authorized the committee to whom they entrusted the revision of the Pharmacopœia, to invite the co-operation of the Colleges of Pharmacy in carrying it forward, (which invitation, so far as the Philadelphia College was concerned, received a hearty response in the form of a revision of the whole work by its committee;) and as a further mark of their respect, caused the adoption of a resolution, which places the incorporated pharmaceutical bodies of the United States on a footing with the medical institutions, by calling on them, in common with the latter, to elect delegates to represent them in the ensuing convention of 1850. Although the wisdom of this step, whatever our opinions as pharmaceutists may be, remains to be proven; yet it is believed that the pharmaceutical corps will cordially unite with their medical brethren in the accom-

plishment of the revisional labour which the convention of 1850 may entrust to their joint consideration and action, and will bring to their aid that practical knowledge of pharmaceutical operations so essential to the proper construction of formulæ, be they chemical or Galenical.

But of what avail, it may be asked, is the correct practical detail, the scientific accuracy, or the beautiful arrangement of a Pharmacopœia, if its provisions are not generally recognised and acted upon by those for whose government it is promulgated?

The vast extent of our country; the sparse and rapidly expanding population of the regions of the South and West; (which precludes the exercise of pharmacy in its more advanced state;) the local prejudices of different sections; and the absolute non-existence of any authoritative national or state legislation in its favour; are some among the many causes operating against the universal recognition and practical adoption of the precepts of the Pharmacopœia.

But there are other and more potent influences in action, which, by extending at the same time a knowledge of the Pharmacopœia itself, and of those sciences and principles upon which it is based, are gradually silencing the prejudiced, gaining new advocates, and consolidating a broad basis of favourable public opinion upon which to place the pharmaceutical superstructure.

Perhaps of the many causes which are conducing to this end, the United States Dispensatory and the American Journal of Pharmacy should be placed in the foremost rank. The former work, indeed, by its very general adoption, and from the fact that the second or pharmaceutical portion of the book may be considered as a commentary, or exposition of the Pharmacopœia, has done more than any other agent. Its enlightened authors, by their talent and research, have rendered it so replete with information on all subjects connected with pharmacy; and in their full digest of the processes of our national work, as compared with other stand-

ards, have placed the former in so favorable a light; that the adoption of its formulæ is becoming more and more general wherever the Dispensatory is known, which may be said to be everywhere in the United States, where the preparation of medicines is in the hands of the regular apothecary or the junior practitioner.

The American Journal of Pharmacy, by its constant advocacy of the authority of the Pharmacopœia; by its steady adherence to an elevated tone in upholding and illustrating those scientific principles, without which pharmacy is mere empyricism, and by acting as the organ of presentation of most of the new remedies which are constantly arising at home and abroad; has undoubtedly done much in the cause of pharmaceutical reform.

The Colleges of Pharmacy should also be adduced; particularly the Philadelphia and New York colleges. The former, the oldest pharmaceutical institution in the country, by her many graduates scattered over the Union, imbued with a knowledge of sound principles of pharmacy, is constantly extending her influence and advocating the cause of the National Standard.

The hundreds who annually resort to the medical schools of this and other cities, become necessarily acquainted with the precepts of our Pharmacopœia, and, in retiring to their future homes, whether these be in the rising cities and towns, or the secluded vallies of the distant West and South, they will adopt them in their practice, and respect the authority from which they emanate.

And, finally, the spirit of the age, as exhibited in the eager adoption of rapid means of communication by steam and electricity, by familiarizing each section of the Union with the others, by the constant intermingling of their citizens, and by the rapid circulation of ideas, is altogether in harmony with the existence of a universally acknowledged Pharmaceutical Code.

As six years of the ten which separate the last revision

from the one ensuing have elapsed, it may be asked what has been done by those most concerned, in preparing for that event? What processes have been found imperfect? What formulæ incorrect? What officinal substances useless, or what new remedies worthy of introduction discovered? The period which yet remains should be distinguished with the gradual but complete evolution of the answers to these queries, so that the duties of revision, onerous as they are, under the most favourable circumstances, may be facilitated and lightened.

It is much to be desired, that the next edition of the Pharmacopœia may be national in detail as well as in name; that its provisions may be sufficiently comprehensive to embrace the well grounded pharmaceutical preferences of different sections, when these are not incompatible with that unity of design and scientific propriety, which should be marked features of a work issuing from so dignified, and learned a body, as it is presumed the convention of 1850 will be. In order to accomplish this, some means must be resorted to, to enable the revisors to appreciate the opinions of all sections of the Union. It is with a view to this general expression of sentiment, so far as pharmaceutists are concerned, that this essay has been written, hoping that some of its hints may be of service in pointing out a course.

Dr. David Stewart (late pharmaceutist,) of Baltimore, than whom no one has more enlightened views of our profession, or a keener desire for its advancement, has suggested the propriety of a Pharmaceutical Convention, to meet in Philadelphia prior to the next revisional epoch, which shall represent as many sections of the country as possible; in order that a comparison of the general views might be obtained. To render the plan feasible, he suggested that the delegates from great distances should be constituted of those pharmaceutists who annually resort to Philadelphia, New York, &c., in the pursuit of their business, and who would come possessed of the sen-

timents of their respective neighbourhoods on the merits of the Pharmacopœia.

If this plan was carried out with spirit, it would undoubtedly be attended with good results; but unfortunately for its success, the gentlemen who resort to our marts are generally too much occupied with their private business; take too little interest in the subject; or from their representing in many instances the wholesale dealers rather than the apothecaries, might not be qualified for the necessary judgment in the case—which requires a knowledge, not merely of what drugs are most employed in this or the other section, but what processes do not yield products of a satisfactory character, or what formulæ of great admitted value have not found a place in the work.

It is the opinion of the writer that a much more general expression would be obtained, and in a form more conducive to the end in view, by the following course:—

It is presumed that in every city or town which contains ten or more apothecaries, there exists a pharmaceutical public opinion, which shows itself in an analogy of sentiment in regard to certain preparations, or the Pharmacopœia in general, and which embraces to a certain extent the views of the practitioners of medicine in the same locality. As these cities or towns are resorted to by country physicians for their supplies of medicines, they necessarily come in contact with the apothecaries, who thus extend their influence far beyond their immediate neighbourhoods, and such cities or towns become Pharmaceutical *centres* of more or less importance. If, therefore, one or more of the most intelligent pharmaceutists of each of these *centres* would open a correspondence with some general *centre of record*, giving the views of his colleagues on any imperfections of the existing Pharmacopœia, or on any suggestions tending to its improvement, a mass of information would be obtained, embracing the united expression of the profession.

If such a course was pursued, its effects on the Pharmacopœia, however beneficial, would be but secondary to its results on the state of pharmacy throughout the country. In many of the cities and towns of France, it is common for the apothecaries to form societies for their mutual benefit and improvement, which associations embrace the possession of a library, a laboratory, and sometimes a botanical garden, but generally without a school of pharmacy. This is a course well worthy of the attention of American pharmaceutists, if adopted in places like Pittsburg, Cincinnati or St. Louis, Charleston, New Orleans, Albany or Buffalo. Associations of this kind, having for their object the elevation of the profession and the improvement of its members, by the establishment of libraries, embracing works on Pharmacy and the accessory sciences, (including some of the best periodicals, both foreign and domestic,) to which might be added, in process of time, a laboratory for the use of the members—and by encouraging correct principles and discouraging empyricism—would be productive of lasting benefit, and would create in each place an *esprit du corps*, that would manifest its existence in a question like the one under discussion, by calling forth a degree of respect proportioned to the tone of proceedings it originated. I know it will be said that petty jealousies and the restless pursuit of wealth would interfere with the formation or existence of societies, which in their nature would be to a greater or less extent the censors of their neighbourhoods. Be it so;—it is an additional motive for their establishment; and if twenty or ten will not join, let five commence the good work, for they will be amply rewarded in the end. The amount of funds which five individuals will be able to subscribe, though small, and perhaps inadequate to the possession of a place of meeting with its accompaniments, would be amply sufficient to purchase a set of the most approved pharmaceutical and chemical works, and to subscribe to some of the best scientific periodicals bearing on the pro-

fession. The annual accumulation of these would form the nucleus of a future library, and perhaps be the humble means of inciting efforts for self improvement, the results of which may not be confined in their utility by the boundaries of our country, or the waters of the Atlantic. Our journal would then avoid the reproach to which it is sometimes obnoxious, of being a mere reprint of foreign periodicals, and with the increased number of zealous observers, not only would *it* rise in character and importance, but similar publications would originate in other localities, bearing on their pages the impress of scientific acquirements of a respectable order.

But to the object in view. It is hardly probable, in the short time which will elapse before the next revision, that much local change will be effected in the way suggested, even if the parties should concur; but it lies in the power of every apothecary or physician who may have improvements or criticisms to offer, to contribute something towards the work in his individual capacity, by presenting his views in a communication to this journal; which from its central location, general circulation, and as being the only purely pharmaceutical organ in this country, is peculiarly fitted for the object. If such a course were adopted and pursued during the four ensuing years the whole ground of the Pharmacopœia might be gone over, and a fund of useful hints and suggestions collected ready for the action of those, to whom the Convention of 1850 shall delegate the revision.

Whilst on this subject it may be apposite to observe, that in one important feature the Pharmacopœia of 1840 differs from its predecessors, viz.: in the employment of the method of displacement in the preparation of certain vinegars, extracts, syrups, tinctures and wines. Inasmuch as the introduction of this method into pharmaceutical operations was of recent date, and a knowledge of its application by no means general, the revisors of the Pharmacopœia, whilst

they adhered to the old mode, by maceration, have appended, in many of the instances where it was applicable, an additional formula, in which the substance or substances are exhausted by the displacement process. The wisdom of this step must be apparent to all who reflect on the subject. The intrinsic merits of the new process were too palpable to be disregarded; on the other hand, a knowledge of its right application, or, indeed, of the method at all, was too limited to trust to its exclusive adoption, even in those cases where its superiority was beyond question. Its presentation in the Pharmacopœia is an endorsement of its value, and doubtless, hundreds who otherwise never would have known or employed it, have thereby been induced to try its capabilities.

In the natural progress of things, the unconditional adoption of this method in those cases where its *utility is beyond a doubt*, may be looked to as one of the features of the next edition of the National work. Ten years *pupilage* will have afforded ample opportunity for the apothecary to test its value, and it is very much to be desired that every pharmaceutist within our national borders will acquaint himself with it by practice, to enable him at least to judge of its merits. There ever will be those who rebel at all innovations, however beneficial; who discard every amelioration, be it ever so improving, and who, clinging to antiquity as the test stone of their profession, look with distrust and doubt upon all recommendations which tend to overturn their accustomed ideas and practice. To these the process of displacement will remain as a sealed book; but to that class who are impressed with the yet imperfect state of Pharmacy in the United States at large, and to the rising generation of pharmaceutists, it is open, and it is to be hoped that their interest in it will not abate until every formula in which it is applicable be demonstrated beyond question, and those cases where it is inappropriate be well ascertained and exposed.

## ART. II—OBSERVATIONS ON PHOSPHATE OF AMMONIA.

By Charles Ellis.

We are indebted to Dr. T. H. Buckler, of Baltimore, for an interesting communication on the use of Phosphate of Ammonia, in gout and rheumatism. The theory of Dr. B., in regard to its remedial action in those diseases, the reasons which induced his experiments, together with a history of the successful treatment pursued by him, will be found in the article alluded to, published in "The American Journal of the Medical Sciences" for January, 1846.

Before proceeding with our remarks upon the chemical character of this salt, and the methods of preparing it, the introduction of which, as a new remedy, by Dr. Buckler, is another contribution from the science of Chemistry to that of Medicine, we propose to make a few extracts from his Essay which will throw some light on the history of the introduction of this salt to the class of the therapeutic agents:

"My attention was called particularly to this subject quite accidentally, and in this way. A gentleman of high intelligence, great acuteness of mind, and a subject of gout, came under my care, in an attack of this disease. Some days after my visit to him had ceased, he addressed me a note in which he complained that his finger joints, which had been for a long time thickened, were more swollen than usual, and that since his last attack they were quite sensitive, so much so as to give him great uneasiness. He further remarked, that, in reading the life of Lord Eldon, he had seen it stated that he, (Lord Eldon,) had been sent, while suffering from an attack of gout, to drink the Bath water, the effect of which was instantly to cut short the gouty paroxysm. He begged me to send him an analysis of the Bath water, and asked, at the same time, if there

was not some agent known to physicians, which would neutralize the matter of gout.

"I wrote him in reply, that gout and rheumatism were the opprobria of medicine. That Lord Eldon might just as naturally have gotten rid of his gout had he gone to any other place than Bath, and that because Lord Eldon had been cured by the use of the Bath water, it by no means followed that the same remedy would relieve him. That we knew of no solvent which would deprive the fluids of the matter of gout; that this had long been a desideratum with physicians, and that there was no doubt that the investigations which were now being made by chemists would shed such light upon the disease, that we should not be very long without a suitable and philosophical mode of cure; information which, in an hereditary point of view, might have been very consolatory to his children, but not likely to prove so to him.

"Fearing lest my patient might think that the difficulty lay not in the science of medicine, but in his physician, I sent him an analysis of the Bath water, and with it all the treatises on gout which I had in my possession, in order that he might see for himself how contradictory the observations and statements of experience were in regard to it. And now having been forced to this confession of ignorance on my own part, and on that of the profession generally, I begged, in conclusion, to reassure him of the hope entertained by some that the day was not far distant when we should have a direct solvent of the matter of gout. How far my expectations have been already realized, remains to be seen."

"During, and after an attack of either of these diseases, thickening often takes place in the fibrous and cartilaginous tissues. In gout this thickening most generally occurs in the small joints of the fingers and toes: but in rheumatism it is oftener seated in the larger articulations, and about the valves of the heart, and, when chronic, often converts the

fibrous tissues into fibro-cartilage, and cartilage into bone. And where chemists have examined these structural thickenings, they have found a variable abnormal per centage of earthy matter, consisting for the most part of soda and lime. Both diseases are frequently associated with what is called the uric or lithic acid diathesis; that is to say, when a man has a gouty or rheumatic habit, it is generally found that lithic acid is in excess in the secretions of his skin and kidneys. When an individual labours under an acute attack of gout or rheumatism, his recovery is generally heralded by a redundant deposit of lithic acid in his urine. This harbinger of a favourable termination to the disease may happen on the second day of his attack, or on the sixth week, as may be; but whenever it does appear, it may very safely be said that the patient is convalescent.

"By what mode this acid is eliminated, or what accident it is which determines its separation, we are unable to say; it stands merely as an isolated fact that by some chemical or vital change taking place, uric acid is separated in great quantity and the individual is relieved. The urine in the course of such an attack may be examined and found as clear as water, and the fluid passed ten or twenty hours after, so loaded with lithic acid as to resemble the washings of a wine cask or beer barrel. From whence is this enormous quantity of lithic acid so suddenly derived? Not from any sudden defect of assimilation occurring in the course of the disease, or from the solids of the body. It is most likely then derived from the blood; but uric acid cannot have existed there in a free state, or it would have been passed from day to day. If then it existed in the blood, it must have been in some state of combination with soda, or lime, or both. And this is the more likely, when we reflect that the concretions and thickenings which take place in the fibrous, cartilaginous, and white tissues generally, as before stated, are owing to the deposit in them of soda and lime in variable proportions with lithic acid. Taking into

account these two prominent facts above stated, namely, the excess of lithic acid found in the urine at the period of convalescence from an attack of acute gout or rheumatism, and the subsequent deposit of soda and lime in the white tissues, it occurred to me, that, during the existence of these diseases, the lithic acid might exist in the blood in a state of combination with soda and lime in the form of insoluble compounds, which the kidneys and skin refuse to eliminate. If then any agent could be found capable of decomposing the lithates of soda and lime existing in the blood, and of forming in their stead two soluble salts, which would be voided by the kidneys and skin, we should thereby get rid of the excess of fibrin in the blood, the symptomatic fever and the gouty and rheumatic inflammation, wherever seated, which have been excited by the presence of these insoluble salts. It occurred to me that *phosphate of ammonia* might be the agent, provided it could be given in doses sufficient to answer the end without producing any unpleasant physiological symptoms. If our theory were true, phosphate of ammonia seemed to be the proper reagent, for it would form in place of the insoluble lithate of soda, two soluble salts, the phosphate of soda, which is remarkably soluble, and the lithate of ammonia, which is also soluble, and both capable of being readily passed by the skin and kidneys. The excess of uric acid would thus be got rid of in the form of lithate of ammonia; and the soda, floating in the round of the circulation, (instead of being deposited, as it were, like an alluvial formation in the substance of the fibrous and cartilaginous tissues,) would be taken up by the phosphoric acid and eliminated from the circulation. Based on this theory I determined to try this salt, and it was not long after that a favourable opportunity presented itself."

Since the publication of Dr. Buckler's paper, phosphate of ammonia has ceased to be known only to the chemist, and has become one of "the new remedies." If time shall

establish its character, and confirm the experiments which have thus far been made, it will no doubt be added to the list of officinals in the next edition of our National Pharmacopœia.

This salt is readily prepared by the direct union of phosphoric acid and ammonia, with which it forms three combinations, containing one, two, and three equivalents of ammonia. The first salt is composed of one equivalent of acid, one of ammonia, and two of basic water; the second salt of one equivalent of acid, two of ammonia, and one of basic water; and the third salt of one equivalent acid, three of ammonia, and no basic water, being salts of the tribasic phosphoric acid in which the basic water is partially or wholly displaced by ammonia. The first mentioned salt is called by some authors the biphosphate—the second salt, the neutral phosphate, and the third salt the subphosphate. It is the second salt or neutral phosphate that it is designed to employ as a remedial agent.

Of the two methods for obtaining phosphoric acid—by the action of nitric acid on phosphorus, and by the decomposition of calcined bones—the latter is preferred on account of its safety and cheapness. The following is the usual formula, viz:

Take of Bone burnt to whiteness and powdered 10 lbs.
Sulphuric acid 6 lbs.

Mix them in a stone-ware vessel, and add one gallon of water—digest for three or four days, frequently stirring, and add a gallon of boiling water—strain through linen, gradually adding more boiling water until the liquid passes without much taste. The sulphuric acid acts upon the lime of the bone-earth, effecting a partial decomposition, the greater portion of its phosphoric acid is liberated, which acts as a solvent for the remaining portion of bone-earth, and remains in the strained liquor as a superphosphate of lime contaminated with a portion of sulphate of lime. The acid solution is concentrated to one gallon, and, by cooling, deposits the sulphate

of lime. The supernatant fluid is then saturated with carbonate of ammonia, which combines with the excess of phosphoric acid, and precipitates the phosphate of lime which it held in solution, and the filtered liquor, after concentration by a gentle heat, is set aside to crystallize.

The evaporation of the solution should be conducted at a very low temperature, which at no time should exceed 100° Fahr., and for this purpose the drying room heat is perhaps the most favourable. By spontaneous evaporation the salt is obtained in more regular and larger crystals; and where time is no impediment, that mode of isolating it adds much to the beauty of the product. The necessity of using a low temperature is owing to the extreme readiness with which the neutral phosphate parts with one half of its ammonia, and assumes the state of acid, or bi-phosphate, which change, besides diminishing the product, unfits the salt in great measure for producing the therapeutic effect required of it. After removing each crop of crystals, it is necessary to concentrate the solution, and to add more ammonia, so as to crystallize from a neutral or slightly alkaline solution.

Neutral phosphate of ammonia crystallizes in square prisms, terminated with four-sided pyramids, with the apex truncated. Crystals of the alkaline phosphate, which assumes the form of six-sided plates, derived from the rhombohedron, are frequently found mixed with the neutral salt. It should be observed that the solution requires to be decolorized with animal charcoal before being placed aside for crystallization.

It has been suggested that oxalic acid, if added to the solution of super-phosphate of lime, would by its superior affinity for lime throw down that earth, and thus increase the amount of phosphoric acid in the solution capable of uniting with the ammonia. We have not had an opportunity of testing its power by experiment, and hence cannot recommend its use, but we believe, even if it should enjoy that property, its price, added to the danger of con-

taminating the product, will be good reasons for avoiding its use.

For the process for obtaining phosphoric acid from phosphorus, the reader is referred to the United States Dispensatory, art. "Acidum Phosphoricum Dilutum" of the London College. According to the experiments of George W. Andrews, chemist, of Baltimore, one pound of phosphorus yields three and a half pounds of phosphate of ammonia, which is less than the theoretical quantity, owing, no doubt, to the loss of material during the oxidating process.

It may be as well to state that the usual formula for the administration of the phosphate is as follows, viz:

℞ Ammoniæ phosphatis, . . . ℥ss.
Aquæ, . . . . . f.℥vj.
M. ft. solutio.

The dose of this solution is a table spoonful three times a day for an adult.

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## ART. III.—PHARMACEUTICAL NOTICES.

By Augustine Duhamel.

### *Laudanum, with and without Narcotine.*

Opium in the form of alcoholic tincture is of such high importance as a remedy in popular use and estimation, that I feel that any observations respecting its mode of preparation, differing from the present observance to "*authority*," must be regarded by some as a useless innovation. Nevertheless, the experience I have had, and the satisfaction consequent upon the good results of preparing and vending laudanum freed, almost, if not wholly, from *narcotina*, the noxious principle of opium that occasions all the distressing

symptoms*—induces me to call the attention of such as are unacquainted with this process to its superior advantages.

Our U. S. Pharmacopœia directs us to macerate a portion of opium, first dried, and then reduced to powder, in a certain quantity of diluted alcohol, for the space of fourteen days, at the end of which time it is to be expressed and filtered. This is then a solution containing all the active, including the bad as well as the good, and also much of the inactive principles of opium—and hence unsuited to the idiosyncracy of many patients, and for administration in large doses, when a sedative and not a narcotic influence is required.

In the desire to separate these and employ a solution of the good and efficient properties only of opium, many preparations have been devised as substitutes, having for their base morphia. A preparation much in vogue at the present time, and known as McMunn's Elixir of Opium, is believed to be a solution of meconate of morphia, obtained from a

* With respect to the action of narcotina, the prevailing opinions may be learned from the following extract from Pereira's Elements of Materia Medica. "When narcotina was first discovered, it was said to be the stimulant principle of opium, and Majendie states, a grain of it, dissolved in olive oil, produced the death of a dog in twenty-four hours, while twenty-four times this quantity was given, dissolved in acetic acid, with impunity. Orfila, at one time, declared it was inert, then, that it acted like morphia, and subsequently that its operation was remarkable and peculiar. Bally asserts that, in a solid state, it is inert, for 129 grains may be given at one dose, without exerting any obvious effect. The truth is, I believe, that narcottna possesses but little activity, and I presume, therefore, that the first experimenters with it employed an impure substance. Dr. Roots gave gradually increased doses of it up to a scruple, without the least injury. The bitterness of its sulphuric solution led him to employ it in intermittents, as a substitute for disulphate of quina. More recently, attention has been drawn to it in India, by Dr. O'Shaughnessy (*Brit. and For. Med. Rev., Vol.* viii. p. 263,) as an Indian indigenous substitute for quina, and nearly 200 cases of intermittent and remittent fevers, treated by it, have been published."—Ed. Amer. Journ. Pharm.

cold infusion of opium, to which wine has been added in sufficient quantity to ensure its preservation. The fact of its being given in large doses without producing any unpleasant symptoms whatever, is ascribed to its not possessing any *narcotina*. A denarcotised laudanum, formed of opium, from which the narcotine had been isolated by maceration in ether, has long been known, and its pleasing qualities advocated by many medical writers. At one time it so far claimed the attention of chemists, as to induce Prof. Hare of the University to prepare a quantity of it, portions of which he distributed among our apothecaries, in the view to have its virtues made manifest, and at the same time elicit for it a preference over ordinary laudanum. This is, however, an expensive preparation, from the quantity of ether wasted—opium itself being a dear drug; consequently very little heed has been given to the making of denarcotised laudanum; but when the fact becomes more extensively known, that simple water can supply the place of the ether, we may then look for its more general adoption. The method I pursue in making laudanum, taught by my eminent instructor, and at present pursued by some of my colleagues, is first to divide the opium as finely as possible, (either by bruising in a mortar, if dry—or cutting in small pieces, if moist,) and macerate it in a quantity of water sufficient to cover it, during twenty-four hours: it is then expressed forcibly through a cloth, and the marc malaxated with the fingers, so as to reduce the coherent particles, and again subjected to the action of an equal quantity of cold water; and after being allowed to macerate for a couple of hours, is again put under the press and the liquid parts extracted; the residuum is then placed in a mortar and rubbed down by means of a small quantity of water and some fine sand, to a pasty consistence, then transferred to a funnel, and water added until the quantity requisite to form half of the menstruum is made up from percolation; to this aqueous solution add the alcohol, and set aside for some

time to give the benefit of the colour to the alcohol, which it takes from the finely diffused extractive;—lastly, filter through paper. In the process here employed we have a solution containing the whole of the meconate of morphia and codeia, whilst the narcotina, resin, caoutchouc and ligneous matters are left behind.

The principle of displacement applied to opium has been very properly objected to, in the apprehension that carelessness or want of skill in conducting the percolations might occasion great disparity in the results; yet in experienced hands, and managed with the proper care, the witness can perceive the beauty and efficiency of the *principle*, in enabling the operator to exhaust the marc of opium, not only of colour, but of odour and taste.

Chemical authority might be given here for the statement that the narcotina is wholly separated by these means; but as others equally good speak of a portion being taken up by the meconic acid in union with the morphia, I made an experiment to test the fact.

Four ounces of laudanum, thus prepared, were evaporated to dryness, and the gummy extract then digested in ether at 80° F. for twenty-four hours, during which time it was occasionally raised to the point of ebullition; the ether, which underwent no change in colour, was then decanted and suffered to evaporate; ere this was wholly accomplished, a slight crystalline deposite was observed upon the side of the vessel, and by the action of nitric acid and sesquichloride of iron, proved to be narcotine, mixed, however, with resinous matter. The weight of both was a little more than one-third of a grain.

Having on hand some aqueous extract of opium, prepared by an eminent house of this city, I essayed 150 grs. in the same manner, but without obtaining the least evidence of narcotina. The ether became colored yellow, and after evaporation left a dark viscous extract with traces of a fixed oil. This may have been prepared from opium

analogous to that collected in France, and described by Pelletier as containing *no narcotina.* I find no mention made of the average proportion of narcotina in good Turkey opium. From experiments made by Dr. O'Shaughnessy upon upwards of fifteen different specimens of India opium, he found the per centage to vary from three-fourths to six per cent.

### *A Method of Writing upon Glass.*

M. Simonin, of Nancy, has suggested an easy method of engraving divisions, letters and unalterable characters upon glass, for the use of chemists and apothecaries. It is as follows: Spread with a soft brush a coating of engraver's varnish upon the bottles or tubes you would use; when dry, trace your letters with a pointed instrument, so as to remove the varnish; over these places spread a moderately thick coat of a soft paste, made extemporaneously with powdered fluor spar and strong sulphuric acid. After several hours of contact, wash it, and the glass will be found sufficiently corroded. For the formation of indelible marks for labelling purposes, the action may be rendered more energetic by covering the paste over with a piece of sheet lead.—*Journ. de Chim. Med.*

I have tried the above given method with the most satisfactory result. I would recommend, however, a coating of wax instead of varnish, as tending better to preserve the glass from being acted upon, except in the parts exposed.

The action of the paste during the space of eight hours, produced well defined lines, as strongly marked as though done with a file; five minutes time gave a very perceptible impression. A. D.

## ART. IV.—AN ESSAY ON ALCOHOLIC TINCTURES.*

By M. Jaques Personne.

We designate by the term alcoholic tinctures, solutions in alcohol of the principal medicinal principles contained in vegetables and animals.

In these preparations, alcohol is almost always employed to hold in solution medicinal substances, and to preserve them from change. They are, therefore, medicines in which practitioners ought at all times to find the active principles, if not in the same state as they are met with in the vegetables themselves, at least in a perfect state of preservation.

The active principles that enter into the composition of tinctures are of a different nature, according to the substances by which they are furnished; some, as we know, are more soluble in concentrated alcohol, as the resins; others are, on the contrary, more soluble in weak alcohol, or in water; as, for instance, the gum resins and extractive matter. From thence arises the necessity of employing alcohol of different degrees of strength to dissolve these substances, regulated according to the medicinal principles the substances on which you operate contain.

The various degrees of strength of the alcohol, intended for the preparation of tinctures, have been chosen in a manner purely theoretical. In fact, when analysis has shown that the active portion of a substance is soluble in concentrated alcohol, we prescribe alcohol of this description in the preparation of the tincture; on the contrary, if it

* The importance of the information sought after in this essay was so well appreciated by the Societé de Pharmacie, that they offered their prize of 1000 francs for the best essay in answer to the queries they propounded. The above paper of M. Personne received the prize.—*Ed. Am. Journ. Pharm.*

is proved that the active principle is more soluble in weak alcohol, the preference is given to the latter. In the case of substances on the nature of which analysis has not yet decided, the strength of the alcohol has been chosen, in a manner that is almost empirical, basing it always upon analogy.

Relying upon these facts, the "codex" has adopted alcohol of three different degrees of strength for the preparation of tinctures; these degrees are 36°, 32° and 22° of Baume or 86°, 80° and 56° of the centesimal scale. Alcohol at 86° is reserved for substances which are loaded with fat and little soluble substances. Alcohol at 80° for substances containing various resinous principles and volatile oil, and lastly, alcohol at 56° for substances of an extractive nature.

Are these three different degrees of strength which are recommended, the most fitted for the preparation of alcoholic tinctures ? several isolated experiments have thrown a doubt upon this first point.

The intention of alcoholic tinctures is also to provide practitioners with solutions of a known strength, that they may be able to calculate the relative proportion between the quantity of the tincture prescribed, and that of the substance used in its preparation.

The extremely varying nature of the vegetable and animal substances used in the preparation of these medicaments, cause us to imagine, in the very onset, that the same quantity of the vehicle cannot be sufficient to dissolve, entirely, all the principles contained in each of these substances : in that case the proportion of the alcohol ought to vary according to the quantity of soluble matters contained in the substances employed. But as it is useful that practitioners should easily remember these proportions, different authors all agree to admit but a small number. On this account the " codex" prescribes, in most cases, the proportions of four parts of alcohol for one part of the substance employed.

Are these four parts of alcohol sufficient to extract the whole of the active principles of the animal or vegetable substance employed, or does not a certain quantity of these principles remain in the substance, not being able to enter into solution in the alcohol, on account of the small quantity of that vehicle? In the first place the proportion between the alcohol and the substance employed would be correct; in the second, this proportion would not be correct; and the result of this uncertainty would be that, if the practitioner should prescribe any particular dose of a tincture, he would not know how much of this tincture represented the substance employed in its preparations, how many parts it contained of the vegetable or animal matter in the solution, and consequently he would not be able to judge with certainty of its effects.

The first, and I should say the only attempts known for determining the real strength of the alcohol, as well as the proportional quantity to employ in the preparation of tinctures, were made in 1817, by Messrs. Cadet and Deslauriers.*

The process these able pharmacopolists employed, and which they have laid down as the best means of arriving at results as exact as possible, is divided into two distinct operations.

The first consists in completely exhausting a given weight of each substance, previously dried in stove, by maceration in cold alcohol at 36° Baume; the reduction in the weight of this substance indicates the quantity of matter dissolved by the alcohol. In performing the same operation with distilled water, we obtain the proportions of matter dissolved by the water and the alcohol, separately, and we ascer-

* (*Journ. de Pharmacie, Vol.* 3, *p.* 402.) I ought, however, to mention the attemps to attain the same end, made by M. Masson-Four, (*Bulletin de Pharm, Vol.* 1,) and those of M. Coldefrey, (*Journ de Pharm, Vol.* 2.) which consisted in exhausting the substances on which they operate, by macerating them several times in hot alcohol, &c., but time and practice have proved that the end did not justify the means.

tain, according to these authors, the quantity of soluble matter in a given weight that any substance can furnish.

These points being ascertained, we must have recourse to a fresh operation to determine the relative quantity of the two vehicles necessary to hold in solution all the soluble principles. These operations consist in preparing saturated tinctures, by macerating the substances you wish to operate upon in the smallest possible quantity of alcohol at 36° B., filtering and evaporating a determinate weight of the tincture, to ascertain the quantity of matter held in solution, to repeat the same operation with distilled water; then to discover the quantity of alcohol necessary to dissolve a certain portion of the extract obtained by the alcohol, and to repeat the operation with water and the extract obtained by that solvent. It will be sufficient then to multiply by the quantity of the extract furnished by the substance, the quantity of each liquid necessary to dissolve an aliquot part of the extract, to obtain the proportions of alcohol and water, the mixture of which would be proper for the preparation of the tincture.

This process, ingenious as it is, is nevertheless not exact, for it rests upon a principle, the proof of which is far from being proved—a principle, which, in the generality of cases, is even false.

In fact, it is not correct to say that if we macerate separately in alcohol and water a substance containing resinous oily matters, and with extractive and gummy substances, we dissolve, by means of alcohol, all the matter soluble in that liquid that the substance contains, and that it is the same in the case of water. For, in order that that might be true, it would be necessary that these matters, of a nature so distinct from each other, should exist in the vegetable in a state of complete separation.

Is it not, on the contrary, more reasonable to imagine that these substances are in a nearly complete state of combination, and, that, being thus combined, they are not separated by the separate action of each solvent? It is only in this

manner we can explain the difference of the results at which I have arrived in the case of several substances, as we shall see in the account of the experiments I shall presently mention.

Thus, therefore, no sufficiently correct experiments exist to legitimatise the three degrees of strength of the alcohol recommended by the "codex."

Neither is there anything that enables us to ascertain precisely whether the relative quantity of alcohol recommended is sufficient to dissolve, entirely, the active principles of the substances submitted to its action.

It is for the purpose of removing the obscurity that exists on these two principal points, that the *Société de Pharmacie* has mooted the following two propositions to "ascertain by precise experiment what is the most proper strength of alcohol for the preparation of alcoholic tinctures."

"What is the relative quantity of alcohol necessary to dissolve the medicaments most generally employed?"

If the numerous experiments I have made do not lead to a definite conclusion, and perhaps we may give the present state of science as the reason, they will at least serve, as I believe, to dissipate to a great extent the obscurity that exists in the preparation of alcoholic tinctures, and decide definitely, in the case of a great number of them, the proper strength of the alcohol as well as the necessary proportion of that liquid to dissolve under the most favourable circumstances, and the most completely, the active principles of the substances used in these preparations.

These experiments are of two kinds:—1. To ascertain if the proportionate quantity of alcohol employed at the present time is sufficient to dissolve entirely, or at least as nearly as possible, the principles contained in these substances, or otherwise; and to discover what is the best proportion to employ. 2. To ascertain, also, the strength of alcohol most fitted to dissolve the active principles of these substances.

To determine the quantity of alcohol necessary, our aim must be to macerate with different quantities of alcohol, then to collect the whole of the tincture, and submit it to evaporation; or for the purpose of ascertaining the weight of the diminished matters. My first intention was to employ expression to extract the tincture, but I was soon convinced that that method was insufficient; the same operation repeated several times with the same proportions of the solvent and the substance, gave me results that differed too greatly. In fact, it is impossible so to regulate the pressure that it may be the same in all instances; in that case, there remains in the residuum a larger or smaller quantity of the tincture, and consequently of the principles; which have, nevertheless, been dissolved by the alcohol.

The following is the process on which I decided, a process which was pointed out, however, in the programme of the prize proposed by the *Soécité de Pharmacie*, and which is certainly the best means of arriving at correct conclusions.

A determinate quantity of the substance was macerated for a fitting time in a given proportion of alcohol; the maceration being completed, the whole was thrown upon the filter, the amount of the filtered tincture was carefully weighed, and then evaporated in a sand-bath; then the extract obtained was dried in a stove heated to from 158° to 174° until it no longer lost weight. The weight of this extract deduced from that of the evaporated tincture, gave me the weight of the alcohol contained in that portion of the tincture: simple proportion, then, was sufficient to ascertain the total weight of the extract which the whole of the tincture would have produced.

15 grammes of cinnamon, for instance, were macerated with 5 parts, or 75 grammes of alcohol, at 80°; the weight of the tincture that passed through the filter was 27 gr. ·08; that of the extract obtained from this quantity of tincture, and completely dried, was 0gr. ·94. Deducting 0·94 from 27·08, we obtained 26·14 for the weight of the alcohol con-

tained in the evaporated tincture: then, the following proportion 26·14: 0·94 : : 75=x gives the total weight of the matters the whole of the alcohol has dissolved: x=2gr. ·69 of extract.

All these experiments were made with the same care. I always employed the same substance for each series of experiments, and for that purpose I prepared powders of each in sufficient quantity for all the operations. The maceration lasted fifteen days in each case, and to avoid any loss of alcohol during the filtration, the receiving vessel was covered with a sheet of paper fixed to its edge, having in its centre a hole just large enough to allow the tube of the funnel to pass through; the latter was also covered with a sheet of paper kept in its place by a plate of glass.

As to the means of determining the proper strength of the alcohol, it was thought proper to vary it according to the nature of the substances to be experimented on.

When the active principles contained in those substances were clearly defined and characterised, I ascertained their quanities; this I was able to do in the case of barks, nux vomica and jalap.

These quantities were ascertained in the following manner: for bark and nux vomica the tincture was evaporated in a sand-bath, and the extract obtained was treated with acidulated water, the filtered liquor was precipitated by means of subacetate of lead, to remove feverish matters from the alkaloïd, and then the excess of lead having been separated by sulphuretted hydrogen, the alkaloïds were precipitated by means of a solution of pure tannin; it was therefore while in the state of tannates that the quantities of the alkaloïds were ascertained.

For jalap, I extracted the resin of a given quantity of the tincture.

But if, in the case of these substances, the management was easy, it is not the same for the greater number, in which the active principles are ill defined, and possess no characteristic chemical properties. How, for example, in

the case of hemlock, rhubarb, gentian, &c., can we discover whether the tincture prepared by means of alcohol at 80°, contains a greater proportion of the active principles than that prepared with alchol at 56 ?

Among these substances there are some whose properties are contained in a bitter principle, as in the case of rhubarb, gentian, and wormwood. For these substances I took two determinate quantities, prepared with alcohol of different degrees of strength, diluting them with water to discover that which required the greatest quantity of this liquid to remove the bitterness. Unfortunately there are too many substances for which this mode of investigation cannot be employed, and this was a difficulty I was unable to overcome; it was only by calculation based on the chemical analysis of these substances, that I selected alcohol of a fitting strength. The only method, in my opinion, of attaining the desired object in these cases would be to employ medically, tinctures prepared with these matters, and alcohol of different degrees of strength.

The strength of the alcohols I employed were to the number of five, namely, alcohol at 90, 80, 70, 56, 45 per cent.

To make the facts I relate intelligible, I will, in the first instance, lay down the following principles, to which I was guided by nearly 300 experiments made in this manner.

1. The different strength of the alcohols recommended by the "codex" are not always those which are the best to dissolve the active principles contained in the substance employed.

2. The proportion of four parts of alcohol for one of the substance, adopted by the codex, is scarcely in any case sufficient to dissolve, entirely, the soluble matters of those substances.

3. The proportion of alcohol necessary completely to exhaust these substances, is five parts of alcohol to one of the substance employed. In two or three cases, however, four parts of alcohol are sufficient, but it is useful, I think,

considering the small number of the exceptions, in general, to adopt five parts of the solvent.

4. The proportion of alcohol is always sufficient when it well covers the matters submitted to its action, when these matters are herbaceous, as leaves; but in other cases it is not enough.

I must observe, that whenever the difference between the quantity of the matter dissolved by the alcohol of the strength of prescribed by the "codex," and that I have employed, has been so trifling as to be insignificant, I thought it right to adhere to the strength recommended in that formulary, to avoid almost useless changes.

EXPERIMENTS.—I. YELLOW BARK.

| | | | | | | | | | grs. |
|---|---|---|---|---|---|---|---|---|---|
| 1 pt. or 15 grs | by | 60 gr. | or | 4 pts. | alcohol at | 80° | total, ext. of tinct. | | 1·63 |
| " | " | 75 | " | 5 pts. | " | 80 id. | " | | 1·55 |
| " | " | id. | " | id. | " | id. | " | | 1·59 |
| " | " | 90 | " | 6 pts. | " | id. | " | | 1·47 |
| " | " | 75 | " | 5 | " | 70° | " | | 1·42 |
| " | " | 60 | " | 4 | " | 56° | " | | 1·43 |
| " | " | 75 | " | 5 | " | id. | " | | 1·74 |
| " | " | 90 | " | 6 | " | id. | " | | 1·63 |
| " | " | 75 | " | 4 | " | 45° | " | | 1·50 |
| " | " | 90 | " | 6 | " | id. | " | | 1·78 |

The quantity of the akaloïds was ascertained in the manner I have already described.

150 grammes of the tincture, with 1 part of bark to 5 parts alcohol at 80° weight of precipitate, . . . 2·451

150 grains of tinct. with 1 pt. bark and 5 pts. alcohol, at 56°, . . . . . 0·696

The first calculation made under different circumstances, gave for alcohol at 80°, . . . . . 1·797

And for alcohol at 56°, . . . . . 2·641

We see, by these results, that alcohol at 80°, although it does not contain the largest quantity of extract, removes, however, a much larger amount of the active principle than weaker alcohol.

The preference ought, therefore, to be given to that degree of strength; besides, five parts of the solvent being the proportion that gives the most extract, that proportion ought to be adopted.

II. RED BARK.

| | | | | | | | | grs. |
|---|---|---|---|---|---|---|---|---|
| 1 pt. or 15 gr. | by | 60 gr. | or | 4 pts. | alco. at | 80° | total ext. of tinc. | 1·97 |
| " " | | 75 " | | 5 " | " | id. | " | 2·42 |
| " " | | 90 " | | 6 " | " | id. | " | 2·37 |
| " " | | 75 " | | 5 " | " | 75° | " | 2 05 |
| " " | | 60 " | | 4 " | " | 56° | " | 1·98 |
| " " | | 75 " | | 5 " | " | id. | " | 2·31 |
| " " | | 90 " | | 6 " | " | id. | " | 2·26 |
| " " | | 75 " | | 5 " | " | 45° | " | 1·99 |

QUANTITY OF THE ALKALOID.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 150 grs. of tinct. | made | with | 1 pt. | bark | and | 5 pts. | alco. at 80° precip. | 1·346 |
| 150 " | | | | | | " | 56° " | 1·394 |

We perceive that, in contradiction to what took place in the case of yellow bark, alcohol at 56° dissolves more of the active principle than alcohol at 80. I therefore, prefer alcohol at 56°: and as five parts give a larger quantity of extract than four, I adopt the proportion of five parts of that solvent.

III. GRAY BARK.

| | | | | | | | | grs. |
|---|---|---|---|---|---|---|---|---|
| 1 pt. 15 gr. | by | 60 gr. | or | 4 pts. | alco. at | 80° | total ext. of tinct. | 2.69 |
| " " | | 75 " | | 5 " | " | id. | " | 2·89 |
| " " | | 60 " | | 4 " | " | 56° | " | 3·21 |
| " " | | 75 " | | 5 " | " | id. | " | 3·15 |
| " " | | 90 " | | 6 " | " | id. | " | 3·07 |
| " " | | 75 " | | 5 " | " | 45° | " | 2.87 |

QUANTITY OF ALKALOID.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 150 gr. of tinct. | made | with | 1 pt. | bark | and | 5 pts. | alco. at 80° precip. | 1·102 |
| 150 gr. " | | | | | | " | 56° " | 1·795 |

These results are again the reverse of those obtained with yellow bark; here once more it is alcohol at 56° that dissolves most of the active principle. This experiment agrees with the result of M. Guibourt obtained in 1818, when the Codex of that year was edited, by ascertaining the action of alcohol at different degrees of strength on gray bark; he found, in

fact, that the residue of the gray bark treated by alcohol at 80° still remained bitter, while that which had been treated by alcohol at 56° was insipid.

I should, therefore, give the preference to alcohol at 56°, as the Codex does, and although four parts of this solvent are, as we see by the table, sufficient to dissolve all the soluble matters, I should adopt the proportion of five parts to get rid, as I said above, of these few objections.

We are struck in the very onset with the difference of the results obtained with yellow bark and the two other varieties used; we may ask ourselves the explanation of this anomaly. The most plausible explanation appears to me to be the following: yellow bark, as we see by the last experiments made with it, is that which yields the smallest quantity of extract to alcohol of various degrees of strength—containing consequently fewer extractive or other matters, enveloping the active principle; this last is found in immediate contact with the concentrated alcohol, which is its best solvent; while in the case of the two other varieties of bark, these extractive matters, which are found in greater quantity, are coagulated by the concentrated alcohol, and thus shield the active principle from the action of the solvent. We see, in fact, that in the case of the red bark, which furnishes a smaller amount of extract than the gray bark, the difference between the quantity of the alkaloïd dissolved by strong and weak alcohol is small, while it is considerable in the case of gray bark, which furnishes the greatest quantity of extract.

May we not, also, admit the existence of certain principles at present unknown or badly defined, more or less soluble according to the species of bark to which they belong, principles that will either hinder or assist the solution of the active principle? Notwithstanding the progress of organic chemistry, this science is not at present sufficiently advanced to enable us to understand the composition of organic bodies, and consequently prevent our laying down this hypothesis.

(To be continued.)

## ART. V.—AN ESSAY ON LACTUCARIUM.

By Emile Mouchon.

Since we have been indebted to M. Aubergier for the cultivation of the lettuce, for the purpose of extracting the lactucarium, on a sufficiently large scale to satisfy the wants of the moment, the medical use of this valuable agent surely ought to become general in France.

The thridace (expressed juice of the lettuce) of our pharmacopolists, which we must, nevertheless, be cautious not to consider entirely without virtue, when it has been prepared by a skilful hand, will, for the future, be destined to play a very secondary part, but without being completely neglected, if the honorable pharmacopolist of Clermont, Ferrand, who has made so many and such noble efforts to attain his end, should find sufficient imitators, to meet the constantly increasing consumption of lactucarium. The success of our brother laborer has been so great, also, that we may be well permitted to hope so good an example will not be lost upon us, however great may be the obstacles to be surmounted to realize similar results.

In his last work on lactucarium, M. Aubergier, enters into very interesting details, which induce us to believe that this direct product may be utilized under the form of a syrup, in preference to every other mode of employing it. The author considering also that alcohol at 21° must be the fittest menstruum to dissolve the active principle, proposes to add to simple syrup, the alcoholic extract of lactucarium.

A proposition of this nature deserves consideration when it comes from so skilful and estimable a fellow-laborer, as M. Aubergier. In the meantime, as it bears upon an important subject, it appears to me to be proper enough to examine how far he is right, whatever confidence observations based on his experience may inspire. On this account

I propose, in my turn, freely to examine the question, not, most certainly, presuming to resolve it completely, but, at least, with the intention of facilitating the solution.

And in the first place I must call attention to the fact that nothing proves that the lactucarium taken in a natural state, in pills for instance, according to the express recommendation of Doctor Francois, is not more active than its alcoholic extract, and other preparations of which it may be the base. Lactucarium is a complex body, it is true, but is it not to be feared that in separating its principles we may weaken its properties? If it were possible for us to procure opium in tears (the gobaar of the Persians,) a product which in certain points of view cannot be compared to anything so well as lactucarium, should we be disposed to alter its nature with the intention of rendering it more efficacious? I think not; for although this also is a complex body, it is not the less the result of a simple exudation, a milky juice, thickened on the plant itself. If the opium of commerce could, in this respect, be compared to it, none of us, perhaps, would ever have conceived the idea of subjecting it to the various transformations it undergoes in our laboratories, leaving out of the question, however, the learned chemical investigations to which we are indebted for the happy possession of the salts of morphine.

Besides, less exclusive than M. Francois, I am far from thinking that certain preparations of lactucarium are without efficacy; I believe them, on the contrary, to be extremely active; still I prefer the lactucarium in substance, or associated with other agents that cannot in any manner act on its principles. In my opinion it is a substance which ought, as much as possible, to be kept out of the reach of the action of heat, and be maintained in its integrity; for I am disposed to think it is easily changed by certain influences, without, however, having anything very positive to produce in support of this opinion; it is a presumption, nothing more. I press this point no further, because I do

not attach to it more importance than its object deserves. Another case ought to occupy me more seriously—it is that which is attached to the question of ascertaining what menstruum is best for the treatment of lactucarium. Ought we, in fact, to employ weak to concentrated alcohol, sulphuric ether to distilled water, as M. Aubergier thinks? Such is the question I propose to examine in this paper. It is the more delicate on my part, because it may place me in opposition to a skilful brother, for whom I profess the most profound esteem. Still, as we both of us are guided by the ame wish, I have every reason to believe that he will be glad I have inquired into the same subject, even if I run counter to his opinion, so long as I succeed in deducing useful conclusions.

*Treatment of Lactucarium with Ether.*

Two grammes of M. Aubergier's lactucarium yielded to this menstruum 65 centigrammes of a dry substance, white, light, friable, extremely bitter, &c. Two doses of the ether are sufficient, a third is almost superfluous, for it has scarcely any effect on the residue. We may indeed, strictly confine ourselves to one, for with 16 parts of sulphuric ether, the second dose only furnished 4 or 5 centigrammes of the product.

It is evident this ethereal extract cannot be an agent fitted to replace the lactucarium; for the active matter, extracted on account of its soluble properties, appears in a very small quantity. Still, however, it must not be considered entirely inert; its decided and characteristic bitterness will not allow us to imagine this. It only satisfies us that the sulphuric ether ought to be rejected, when we wish to extract the whole of the active matter of the lactucarium, and while we attribute to it an action upon the same body, although it may be feeble; this will allow us to believe that a certain degree of virtue exists in the etherolate of lactucarium; that may, perhaps, be employed efficaciously in certain cases,

where the combined use of the two agents seems to be indicated. The instantaneous action of the dissolvent would enable us, in a case of necessity, to prepare this ethereal tincture extempore.

*Treatment with Alcohol.*

The dissolvent power of alcohol on lactucarium resembles that of ether in a greater degree in proportion to the greater concentration of the former. The result of this incontestible truth is that we are obliged to have recourse to alcohol at 21°, as the pharmacopolist of Clermont proposes, when we wish to act upon this body by means of alcohol.

These treatments with alcohol need not be several times repeated; the first treatment carries off almost the whole of the principles that can be combined with weak alcohol. Thus, after twenty-four hours maceration, 8 grammes of lactucarium yielded to 60 of hydro-alcohol at 21°, 3 grammes of a dry extract, of a clear brown color, while a second dose produced only 50 centigrammes; and this was almost all that alcohol at that degree of concentration could extract from the lactucarium. We must add to this observation that the second product bore scarcely any resemblance to the first, although the bitterness was very decided. The alcohol of this second operation, also, had no resemblance to that of the first; it was milky white; that of the first was deeply colored, and rather clouded. A third addition of alcohol left all the matter upon which it could act upon the filter, so that the alcohol was quite milky before the filtration, and perfectly colorless afterwards. That which was left in the capsule was almost insignificant, its weight being not more than 5 centigrammes.

As to the residue, it was no longer bitter, it was insipid. But, if it be acted on by 8 grammes of ether, it makes it bitter and tenacious, and gives up so much of its substance, that 75 centigrammes of dry and almost inert matter remains on the filter. The dissolved matter that remains in

the evaporating vessel, is white, friable, easily reduced to powder and sensibly bitter. Exposed to the action of 125 grammes of boiling distilled water, it makes the liquid decidedly bitter, without sensibly clouding it. The treatment causes it to lose a fifth part of its weight. A strong heat makes it swell, then liquifies it, and causes it to burn with a flame, without leaving the least residue. Thus liquified it is extremely adhesive, and very elastic; ether alone can remove it from the substance to which it adheres; properly speaking it is caoutchouc, for it has all the properties of that body, and all its physical characteristics.

It is worthy of remark, that after having been subjected to the successive action of alcohol and sulphuric ether, this substance still gives up a fifth part of its weight to distilled water, and that it imparts a characteristic bitterness to this last solvent, without, however, causing it to lose its transparency. I draw attention to this observation, because it will assist me in my judgment when I shall have to give my opinion on the nature of the menstruum that should be employed to remove the whole of the active matter from the lactucarium.

*Treatment with cold distilled Water.*

The nature of lactucarium scarcely allows us to consider cold water as a proper solvent of this concrete juice. Still the result of several trials made with the greatest care, is that it can give up one quarter of its weight of one soluble substance or another, if we have recourse to one or several macerations of from twelve to twenty-four hours duration, with 32 parts or more of distilled water.

The liquid is in that case extremely bitter, and rather milky. Its slow evaporation, in a glass capsule, furnishes an extract, which does not appear to differ from the alcoholic extract.

*Treatment with boiling distilled Water.*

Of all the solvents employed in my different essays this is,

evidently, the one I ought to prefer. In fact it is only necessary to place the lactucarium over the fire, until 32 parts of distilled water have boiled, to extract 60 per cent. of its weight, by squeezing the residue in a fine cloth.

The liquid thus collected is extremely bitter, slightly cloudy, and tolerably colored. The substance it leaves in the capsule has all the characters of the preceding. It has a reddish color, semitransparent when in thin flakes, and is insupportably bitter. Boiling distilled water, in sufficient quantity, dissolves the greatest portion instantaneously, and keeps the remainder suspended. The liquid, as it becomes cold, becomes a little clouded, but deposits scarcely anything. This desposit is slightly colored; but it is of little consequence, its quantity being so extremely small.

If we treat the insoluble residue with a fresh quantity of boiling distilled water, we find the same weight after it is perfectly dry. It is the same when this body is macerated in alcohol; let the density of the liquid be either weak or strong, 21 or 36 degrees, the residue remains untouched. Sulphuric ether, alone, has an action, and a powerful action, on this residue. It carries off more than four fifths of its weight of the white substance already noticed, but to produce this effect maceration of 12 hours duration, at least, are necessary; a third has scarcely any result. The ethereal liquids, the first particularly, is of a strongly marked bitter taste, which gives us reason to suspect the presence of a small quantity of the active matter. Still we must only to a certain extent take this bitterness into account, for we ought not conceal from ourselves that ether itself is sensibly bitter.

In addition to this, we may remark, that all these extracts, the aqueous extract in particular, on which heat has had most influence, possess in a very slight degree only the poisonous smell that so well distinguishes lactucarium. This appears to me to prove clearly enough, that the poisonous principle, on the importance of which we must

not deceive ourselves, is partly volatilized during the operation, although the greatest precautions have been taken to preserve it in the product.

This remark is not applicable to the aqueous solution resulting from the instantaneous action of boiling distilled water on native lactucarium. It possesses in a high degree that poisonous smell, and the bitterness, that are such essential characteristics of this vegetable production.

According to all these facts, it appears to me to be most advisable to reject the alcoholic extract proposed by M. Aubergier, and to confine ourselves to the direct treatment of lactucarium with boiling distilled water.

This menstruum removes exactly 50 per cent. of the lactucarium; it would also be advisable to employ two grammes of this base, with 500 of syrup, for the purpose of agreeing as nearly as possible with the operations of our fellow-labourer. Nevertheless, I should consider it still more rational to let the lactucarium enter into the composition at a multiple, that should come as near as possible to the same proportions, as it does in the following formula:—

*Syrup of Lactucarium.*

| | |
|---|---|
| Lactucarium in coarse powder, | 1 gramme 70. |
| Distilled water | 30 grammes. |
| Simple syrup | 500 " |

Place the lactucarium over the fire, along with 15 grammes of water, until the liquid boils; pour it out and press out the liquor, complete the extraction of the matter with an equal quantity of boiling water, pour out this second solution, add the two products to the boiling syrup, and reduce the whole to 500 grammes.

By this process, as simple as it is easy, you realize in an instant, a product whose characters leave no doubt as to the excellence of the medicament. The bitter taste is more decided than in that of M. Aubergier, and the poisonous smell of lactucarium is recognised in all its force.

Thirty grammes of this syrup are equal to 10 centigrammes of the base, and 5 of the extract. This is a reasonable

proportion in more than one respect; the medical action of the remedy being sufficiently powerful to enable you to confine the dose to that of 15 grammes, at most, during 24 hours, and the proportional quantity of the medicine cannot be forgotten.

In addition to this, we must not forget that the stomach, according to Dr. Francois, soon accustoms itself to the action of lactucarium, and it is impossible to produce any sensible effect for many successive days, without rapidly increasing the doses of the medicine; being able to return to the first dose after an interruption of a couple of days. By neglecting this principle, the foundation for which rests on numerous observations, we frequently expose ourselves to miscalculations, which cannot fail to raise a prejudice against lactucarium.

The conclusion to be drawn from the preceding observations appears to me to be very easy. It is evident, in fact, that there is no advantage in treating the lactucarium with alcohol, either weak or strong. Neither does the preparation of an alcoholic extract offer any thing advantageous in practice, while everything is to be gained by the employment of boiling water to extract the active matter; whether we operate for the purpose of introducing it into the syrup, or into any other officinal preparation, without having recourse to any previous concentration.

These conclusions appear to me to be the necessary corollary to the facts I have submitted to the consideration of practical men. In addition to this they seem to answer the end proposed in a most satisfactory manner. Nevertheless, it shall not be my last observation. The confidence with which lactucarium inspires me, imposes upon me, in my turn, the obligation of pointing it out as an agent of the first class, which cannot receive too much attention, in regard to the numerous counter-indications opium exhibits, for which it may fairly be considered as the best succedaneum. Febrile affections are those only that have been mentioned,

as contrary to the exhibition of this remedy, which must also never be administered while the work of digestion is going forward. Its sedative effects on the nervous and vascular system enables it to relieve pain by producing sleep, without any appearance of narcotic effects; it has also been remarked that it usually succeeds in cases where opium has completely failed. It is from these truths that have become trite, but which, nevertheless, cannot be too often repeated, after the miscalculations the thridace of our pharmacopolists have enabled us to place on our annals, as much perhaps from the insufficiency of the doses, as from other causes, which I must pass over in silence.

If the most celebrated physicians of antiquity, with Hippocrates at their head, never feared to place their confidence in lettuce, why should we refuse ours to lactucarium, or to thridace, now the labours of our contemporaries have placed their efficacy beyond doubt? The "plant of the Eunuchs," as the Pythagorians called it, with some reason —that which made Musa, the physician to the Emperor Augustus, worthy of a statue—has not been able to fall in the estimation of mankind; and if, in our days, there are practitioners who despise its sedative powers, it is because, in these times, medical scepticism, become systematic and too exclusive in certain minds, possesses a most mischievous influence even on the most valued agents. Extremes in all things, particularly in medicine, are extremely deplorable; but the time has not yet arrived when what is reasonable shall be right. In the meantime, if it be true, as the immortal Bacon says, "that we rise from facts to axioms," and that afterwards we redescend from axioms to practice, we must necessarily acknowledge that no agent deserves better than lactucarium the various appliances to which it has been subjected, and believe that the opinion of men of science, without any exception, will be completely in its favour.—*Ibid. from Jour. de Chim.*

## ART. VI.—ON THE MORINGA PTERYGOSPERMA, OR OIL OF BEN TREE, AND ITS USES ECONOMICAL AND OFFICINAL.

By William Hamilton, M. B.

The Moringa pterygosperma, or horseradish tree, although not a native of the West Indies, is now perfectly naturalized there, and merits attention both for its economical and pharmaceutical properties.

It is a small tree, of about twenty feet in height, but of most rapid growth, coming into flower within a few months after the seed has been sown, and continuing to produce seeds and blossoms afterwards throughout the year. Its roots have all the flavour and properties of the horseradish, for which it is often substituted at the tables of the planters. The timber is said to dye a fine blue; and the gum which exudes from wounds in the bark bears a strong resemblance to that obtained from the Astragalus tragacantha, for which it might, no doubt, be substituted. The timber was formerly held in estimation for medicinal properties, which it was reputed to possess, and may be found spoken of in some of the older medical writers under the name of *Lignum nephriticum*, from its supposed efficacy in complaints of the kidneys and urinary organs. It gives out a blue colour to spirit or water, which by transmitted light appears of a golden yellow; the blue is destroyed by acids, which leave the tincture or decoction of a bright yellow, but is restored by the addition of an alkali.

The numerous racemes of white blossoms with which the moringa or horseradish tree is constantly loaded, are succeeded by long triangular pods, somewhat torulose at the seeds, and about two feet in length, when arrived at their full growth. These pods, while yet young and tender, are not unfrequently cooked and served up to the planters' tables like asparagus, for which they are no bad substitute.

Each pod, when full grown, contains about fifteen seeds: each considerably larger than a pea, with a membranous covering expanding into three wings, whence the specific name of pterygosperma: a kind of isthmus is interposed between each of these seeds, forming the pod into as many cells as it contains seeds.

On removing the winged envelope, the seeds appear somewhat like pith-balls; but, upon dividing them with the nail, they are found to abound in a clear, colourless, tasteless, scentless oil, of which the proportion is so large that it may be expressed from good fresh seeds by the simple pressure of the nail. Geoffry informs us, that he obtained 30½ ounces of oil from 8 pounds of the decorticated seeds, being at the rate of very nearly 24lbs. of oil from 100 lbs. of seeds. The oil thus obtained is the celebrated oil of Ben or Behen, which, at one period, constituted a valuable branch of commerce with the east, until excessive imposts and extensive adulteration brought it into unmerited disrepute.

The moringa tree, as we learn from Dr. Broughton's Catalogue of East's Garden, inserted in the third volume of *Edward's History of the West Indies*, was introduced into Jamaica from the East Indies in the year 1784, and most probably found its way into the other islands about the same time. Yet though thus established for the best part of three-quarters of a century among our planters, notwithstanding the great value of its oil, and the facility with which it can be obtained, the moringa tree has been hitherto valued merely as an ornamental shrub, and cultivated for the sake of its young pods, or the horseradish of its roots, as luxuries for the table.

The oil which is so profusely obtained from the seeds is peculiarly valuable for the formation of ointments, from its capability of being kept for almost any length of time without entering into combination with oxygen.

This property, together with the total absence of colour,

smell and taste, peculiarly adapts it to the purposes of the perfumer, who is able to make it the medium for arresting the flight of those highly volatile particles of essential oil, which constitute the aroma of many of the most odoriferous flowers, and cannot be obtained, by any other means, in a concentrated and permanent form. To effect this, the petals of the flowers, whose odour it is desired to obtain, are thinly spread over flakes of cotton wool saturated with this oil, and the whole enclosed in air-tight tin cases, where they are suffered to remain till they begin to wither, when they are replaced by fresh ones, and the process thus continued, till the oil has absorbed as much as was desired of the aroma; it is then separated from the wool by pressure, and preserved, under the name of *essence*, in well-stopped bottles. By digesting the oil thus impregnated in alcohol, which does not take up the fixed oil, a solution of the aroma is effected in the spirit, and many odoriferous tinctures or waters, as they are somewhat inaccurately termed, prepared which could not otherwise be obtained. By this process most delicious perfumes might be obtained from the flowers of the Acacia tortuosa, Pancratium carribeum, Plumeria alba, Plumeria rubra, and innumerable other flowers of the most exquisite fragrance, which abound within the tropics, blooming unregarded, and wasting their odours on the barren air. *Pharm. Journ.*

## ART. VII.—ON THE GUM OF THE RHUS METOPIUM, AND ON THE ARISTOLOCHIA ODORATISSIMA, TRILOBATA, AND ANGUICIDA.

By William Hamilton, M. B.

The Rhus metopium is a small tree of some twenty-five feet in height, not unfrequent in the West Indies, and especially in the forests of Jamaica, where the gum which exudes from its bark has been long known for its medicinal properties, although little employed by the regular practitioners. It is commonly known by the names of hog gum and hog-doctor tree, from an opinion which is generally entertained, and rests no doubt on observation, that the wild hogs, which abound in many parts of the island, cure themselves of any wounds which they may chance to have received, by rubbing themselves against the trees from which this gum exudes,* and thus smearing the excoriated part over with a coating of it. This circumstance, first observed no doubt by the negroes, naturally directed attention to its vulnerary qualities, and led to its trial as a salve for healing sores. For this purpose it is boiled with the oil of the Ricinus communis, to which is occasionally added the expressed juice of some of the species of dolichos, known by the name of cat's claws (as the Dolichos filiformis,) when the object is to check the discharge from a running ulcer.

The hog-gum first exudes from the wounded bark in the form of a pellucid juice of a yellowish-white colour, which becomes darker by exposure to the air, and gradually

*For this purpose, taught by what in our ignorance we designate by the unmeaning appellation of instinct, the boars when they do not chance to meet with a tree already wounded and pouring forth its balsamic juice, rip up the bark with their tusks to obtain it. Is not this something closely bordering on reason?

acquires a black colour, and a hard brittle resinous consistence.

In its recent state, this juice, taken to the extent of one or two table-spoonfuls diluted with an equal quantity of water, and sweetened with a sufficiency of sugar, is said by Dr. Barham to afford relief in cases of colic, and to act at the end of four or five hours as a mild aperient. It is also employed for the same purpose in the shape of an enema.

By age it acquires a harder consistence, and becomes astringent in its properties. In this state it is reputed to act as a diuretic upon the urinary organs, and is given in pills for the cure of gonorrhœa, resembling in its effects the more costly balsam of copaiva, for which it might not improbably be substituted with advantage in our shops.

Applied in the form of a plaster to the inflamed part, this gum is said to afford relief in gout and rheumatic affections; acting in these cases not improbably as a substimulant, and exciting the action of the absorbents.

As a topical application to recent wounds and excoriations, both Barham and Browne speak in the highest terms of its vulnerary effects; and the former recommends a cerate, prepared according to the following form, as an excellent remedy for recent wounds:—

℞ Gummi rhus metopii,
Adipis præparati, aa ℥iv.
Ceræ albæ,
Pulveris aristolochiæ odoratissimæ, aa ℥ij.
Resinæ flavæ, ℥j.

M. s. a. ut fiat ceratum.

The aristolochia, which enters into the composition of the above preparation, is a climbing plant frequent in the woods of Jamaica, where it is in considerable estimation among the the local practitioners under the names of *birthwort* and *contrayerva*. Its roots and seeds are bitter and aromatic, and are reputed to be powerful antidotes to the poison of serpents and other venomous reptiles. The roots in decoction are an

excellent tonic and stomachic, but as their active principle is more completely soluble in spirit than in water, the tincture is a still better preparation, and combined with iron very effectual in restoring the menstrual discharge when it has been suppressed or interrupted.

This plant is so abundant in Jamaica, that, were a market found for it in England, a supply to almost an unlimited extent might be obtained; entitling it to the attention of the medical practitioners as a cheap and valuable substitute for some of the more costly articles of the Materia Medica of our shops.

There are many other species of aristolochia common within the tropics, and equally entitled to attention for their medicinal properties: of which the Aristolochia trilobata is to be met with on the south side of Jamaica as abundantly as the A. odoratissima is on the north, and the infusion of its roots is a favorite stomachic with the negroes, who are in the constant habit of employing it, under the name of bastard contrayerva.

In the woods which clothe the hills adjoining the town of Carthagena, the capital of the province of that name in South America, is found another species, the Aristolochia anguicida, known to the inhabitants by the name of snake poison, or contra capitan, the external and internal use of which, if employed in sufficient time, is said to counteract the bite of the most deadly serpents. The Indian jugglers mix the juice of its roots by mastication with the saliva, of which they introduce a few drops into the mouths of the snakes which they exhibit, in order to stupify and enable them to handle them with impunity.

Facts such as these are well worth medical investigation.

*Ibid.*

## ART. VIII.—ON COCHINEAL.

By August Faber, Esq.*

On board the "Tay" West India steamer, in which I came out, there was also as passenger, Mr. Innis, merchant, going out to Vera Cruz. His residence is in the city of Oaxaha (pronounced Oa*h*aka) in the province of that name, where chiefly cochineal is grown. The following information, which I obtained from him, is in several respects very interesting:—

1. "Silver cochineal is the impregnated female just before laying eggs; black cochineal is the *female after laying and hatching the eggs.*

2. "The female, just before laying the eggs, spreads out a large quantity of white powder immediately around her, and to a great distance, in a circle; and the Mexican growers are in the habit of blowing this white powder off the plant as much as possible, saying the young do better without it."

Now we begin to know something of the origin of the difference of colour and shape and *quantities*, in this way: the black, if good, is always *shelly*, the real silver is *never* shelly; and of black cochineal, there is never more than one bag in twenty, or in thirty, or fifty imported, being in fact only what had been kept for seed.

The last quotation given above would suggest to me one more possible fact.

Why, I would ask, is the Honduras cochineal (which, in fact, grows in Guatimala) *invariably brilliant* in colour (silver,) while the Mexican is *invariably* dull, the latter fetching 3*d.* and 4d. per lb. less than the former? I consider it very probable, that the habit of blowing off what is given by nature, namely, the white powder deposited by the females, may be

*Extracted from a letter dated "Madeira, October 18, 1845," addressed to Dr. Pereira, and read before the Pharmaceutical Society.

the reason not only of the dulness of the colour, but also of the generally smaller grain.

3. Mr. Innis told me further, that the more extensive cultivators never kill the insect by immersion, but only by the basket being placed in heated rooms or stoves. The smaller and poorer cultivators use hot water, "by which the insect is mostly burst open, and the 'foxy' colour produced."

"Foxy" is the technical London name for silver cochineal, rather reddish, and very different from the fine transparent red, which forms the finest black.

As I am upon this article, I beg to add a few remarks, more strictly commercial:—

1. The serons in Guatimala are made up to 150 lbs., a mule *there* not being able to carry more than 300 lbs. over the mountains. In Vera Cruz, the distance from shore is 300 miles, but not being so mountainous, the mules carry 400 lbs., the serons being made one-third larger than at Guatimala.

2. In London, every seron of cochineal, on its arrival, is turned out and sifted by the dock companies, filled into English bags, on which the tare to the ounce is marked, the dust of a whole parcel (of 100 to 500 bags) being put together and sold separately from the grain. The invariable custom of sifting exists in no other port than in London.

3. There still exists as an article of commerce, but only just still exists, the sort called "English-dyed black cochineal."

When, in 1826, I established myself in London, this article was extensively shipped to India, Russia and Austria, and for a number of years my Price Current had the quotation of "English black cochineal;" and, in fact, being cheaper in many places, they would not have the genuine black. It was Mexican silver grain *dyed*, and prices were about the following:—Genuine black, 6*s.* 6*d.*; English dyed, 5*s.* 6*d.*; Honduras silver, 5*s.* 6*d.*; Mexican silver, 5*s.*

*Note added by Mr. Wood, Mr. Faber's Clerk.*

Granilla is imported from the same places as the cochineal, namely, Honduras and Mexico, and consists of the very small immature insects. Its value is from 2*s.* to 4*s.* per lb. according to quality.

Garblings consist of the broken pieces of the insects, mixed with the dust and extraneous substances that must of course be gathered with the insects in taking them from the plants. As garblings contain generally a good proportion of the broken particles of matured insects, they are frequently preferred to granilla, unless the latter be of unusually good quality. The value of garblings is 2*s.* to 2*s.* 6*d.* per lb. Each bag of cochineal is sifted here on importation, and it is in this manner that the garblings are obtained, as they are seldom imported so.

The following is a table of the quantities of cochineal exported from and consumed in England in the last twelve years:—

| | lbs. | | lbs, |
|---|---|---|---|
| 1833 | 309,125 | 1839 | 1,010,193 |
| 1834 | 405,350 | 1840 | 1,330,295 |
| 1835 | 516,132 | 1841 | 1,439,742 |
| 1836 | 604,425 | 1842 | 1,207,920 |
| 1837 | 517,882 | 1843 | 1,457,456 |
| 1838 | 536,044 | 1844 | 1,569,120 |

*Chem. Gaz. from Pharm. Journ.*

## ART. IX.—NOTE ON IRIDESCENT SILVER.

By Prof. John Brockelsby.

It is well known to those who are conversant with optical phenomena, that the brilliant play of prismatic colours exhibited by mother of pearl is due to the structure of the surface; provided the shell is cut and polished in a particular manner. This interesting fact was announced to the scientific world in 1829 by the discoverer, Dr. Brewster, who successfully transferred by pressure the splendid tints of the pearl to black wax, fusible metal, balsam of tolu, lead, tin, and various other substances. The colors displayed by fusible metal possess at first extraordinary beauty, which in a short time is partially lost, owing to a change that occurs upon the surface of the metal.

A few months ago, while engaged upon some experiments in electrotyping, I was led to think that by this process the hues of the pearl might be readily transferred to those metals, which from their hardness are incapable of receiving impressions in mass, but yet, on account of their freedom from oxidation, retain for a long time a surface comparatively pure. I therefore took a Smee's battery, which I had just constructed, and after several experiments succeeded in obtaining small sheets of silver, radiant with the hues of the shell. When seen by a single light, as that of a lamp, the play of colours is surpassingly beautiful, scarcely inferior to that of the pearl; and where equal care was employed, the plate of silver, which was formed eight months ago, rivals in brilliancy that which came fresh from the battery a few hours since.

The process by which this result is obtained is as follows. The first thing required is to prepare the shell. This is effected by grinding, and polishing it upon the back, in such a manner as to cut through the numerous concentric strata that compose its substance. When this is done, by the aid of a

microscope the surface will be seen covered with delicate grooves, some thousands in an inch, formed by the sections of the concentric laminæ, and this configuration gives rise to the glowing tints of the shell. The next step is to obtain an exact impression of this surface upon some good conductor of electricity. This we are enabled to do by means of fusible metal, if proper precautions are employed in taking the impression. I pursue exactly the same method as in taking the copy of a medal. After fusing the metal, I pour it upon oiled paper, and when the air bubbles cease to rise through the metal the oxide is skimmed from its surface with a card, and as soon as it presents the appearance of a perfect mirror the shell is forced down upon it by a sudden pressure. When the metal has cooled I remove it from the shell, and having ascertained the accuracy of the impression, immediately plunge it, before any change of the surface can occur, into the silver solution, thereby completing the circuit between the poles of the battery. In a few moments the surface of the metal is frosted with silver, and the configuration of the shell exactly copied. A sheet of silver, of sufficient thickness to be easily removed with a pen-knife, will be deposited in the course of five or six hours under favourable circumstances. The battery I have employed consists of two plates of amalgamated zinc and one of platinized silver, six inches by eight. The working mixture is sulphuric acid and water, the strength varying with the temperature, and the amount of work to be performed. I have found a wine-glass of acid to three quarts of well-water, at the temperature acquired by standing a few hours in a room at 70° Fah., to answer very well, when the surface to be plated did not exceed 1½ square inches. The silver solution is made by dissolving cyanide of potassium in water, and adding thereto the oxide of silver. The ratio of the ingredients I am unable to state, as I have not hitherto directed my attention to this point, but have prepared the solution by trial until I obtained the desired result.

By the process above described, we can at pleasure transfer

the tints of the pearl to those pure metals, which will best preserve their brilliancy, and while the knowledge of this fact is interesting as a matter of science, it may perhaps be well for the artist to consider if it cannot be applied to some ornamental purpose, and the beauty of the precious metals enhanced, by teaching them to glow with the richest hues of light.—*Silliman's Journal.*

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## ART. X.—ON PALM SUGAR FROM INDIA.

By Mr. James Stevens.

Palm sugar is manufactured principally at Cuddalore on the Coromandel coast, by some French merchants of Pondicherry, by which means it comes into the English market as colonial sugar, whereas, if made at Pondicherry, it would bear the heavy duty of foreign produce.

It is mostly got by refining the *jaggary* or crude sugar used by the poorer classes in India. *Jaggary* is darker coloured than the coarsest Muscovado sugar. It is granular or moist; comes in a mat or bag made of palm leaves; is chiefly brought from the island of Ceylon by native vessels (donies) and is made by inspissating the juice of various kinds of palm, principally the *Palmyra* or brah palm, also the cocoa palm, and the *lesser fan palm*, and to the northward, the wild date palm. The juice is collected during the night, by making incisions in the upper part of the stems of the trees, and afterwards boiling it down before fermentation takes place; chunam (lime from sea shells) being added to retard the same. The thick syrup thus obtained is mixed with sand and stones to the amount of ten or fifteen

per cent. to make it more solid, portable, and heavier (of course this is done by the natives, the most abominable set of rascals under the sun.) The same juices, before they ferment, form a cool and pleasant drink, toddy; but if allowed to go on to vinous fermentation, become arrack, which is distilled. In India, all the palm plantations (toddy topes) used for the last two purposes, pay a duty to the Company of one rupee (1*s.* 10*d.*) each tree per year.

At Cuddalore there are five sugar houses, the principal of which belongs to Viney and Cardoza of Pondicherry. Their plan is to dissolve the jaggary in water over a fire, at the same time mixing chunam, to check fermentation, with it; after this it is strained through a filter of animal charcoal, again boiled, and strained through cotton bags. For the purposes of clarifying, they use eggs and chunam. When the syrup is of a proper consistence, it is put into wooden or earthen coolers, and the molasses allowed to drain off. To whiten it as much as possible, rum, or sometimes a fine syrup, is poured over the sugar whilst in the coolers; it is then exposed to the sun to dry, and lastly packed in gunny bags for exportation. It is never mixed with cane sugar. The sugar thus produced, I have no doubt, will eventually supercede the cane sugar. It can be manufactured at a less cost, and the palms affording it grow in abundance in all parts of the tropics, in a dry sandy soil, which would produce nothing else of value. They require very little cultivation—merely enough to keep the luxuriant vegetation from springing up into a jungle around them, and to remove the numerous parasitical plants from their stems. Of course the sugar will improve in quality when more experience has been gained in the way of making it—the oldest factory having been established only five years. The quantity produced I should think was about six thousand tons last year. The molasses are at present of little or no value in the English market, but two of the houses at Cuddalore,

are making rum of it, a sample of which came to England this winter.

The Palmyra and cocoa palms grow to the height of 100 feet or more, in eight or nine years, and the latter variety will for many years yield 500 nuts per annum, a succession of fruit being produced on the same tree throughout the year; the Palmyra palm leaves are used for writing purposes by the natives, they scratch the letters on the leaf with a style.

Were the French colonists at Pondicherry to manufacture sugar in their own territory, they would not be allowed to import it into France. By a treaty between them and the East India Company, they abstain from manufacturing opium and salt, in consideration of which they are paid by the Company a sum of money, sufficient to defray the expenses of government both at Pondicherry and Bourbon. However, the settlers would prefer being under the rule of the British, as they consider their commerce would be benefitted by it. *Pharm. Jour.*

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## ART. XI—ON THE ORIGIN OF SAMOVY ISINGLASS.

By Dr. Pereira, F. R. S.

Among the numerous kinds of isinglass known in English commerce, there is one which is well known by the name of *samovy isinglass.* It is imported from Russia in three forms, viz, as *leaf*, *book* and *short staple*, and is in considerable demand among brewers for making finings.

Some doubt has hitherto existed as to its origin. In the last edition of the *Elements of Materia Medica*, I stated two reasons for believing that it was the produce of the fish

called by naturalists the *Silurus glanis*, these were, first, that the Russian name of this fish was *som*, a term from which the word *samovy* or *somovy* might possibly be derived. Secondly, that according to Martius, from this fish are obtained, leaf, book, and staple isinglass, the three forms in which samovy isinglass occurs in English commerce.

Mr. Faber was kind enough to enquire, at my suggestion, of his Russian correspondents whether this opinion was well founded or otherwise, and I have recently received the following communication from him on the subject: "I have ascertained," he says, "from some of my Russian friends, that what you supposed, is quite correct, viz., that the samovy isinglass comes from the Russian fish *som*. The Russians, having no article, make an adjective of *som* by adding *ovy*, and then pronounce it *samovy*, although *they* spell it *somovy*." *Pharm. Jour.*

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## ART. XII.—EXAMINATION OF THE VOLATILE ACIDS IN VIBURNUM OPULUS.

By L. von Monro.

Chevreul found in the berries of *Viburnum Opulus* phocenic acid, the identity of which with valerianic acid has been proved by Dumas. Krämer has submitted the bark of *Viburnum Opulus* to examination, and considers the volatile acid obtained from it, as well as its salts, not to be identical with valerianic acid from their external properties. The author was induced to repeat this investigation.

The bark of young trees of *Viburnum* was peeled off in spring, carefully comminuted, and submitted to distillation

with water to which some sulphuric acid had been added. 4 lbs. of bark yielded 40 quarts of acid liquid. The distillate was saturated with carbonate of soda and evaporated, when an oil having the odour of *Viburnum* volatilized. The concentrated liquid was again distilled with sulphuric acid to obtain the pure acid; it separated partly in oily drops on the surface of the distillate, and was partly dissolved in it. The drops of oil had the peculiar and strong odour of cheese, as well as the other properties of valerianic acid; the barytic and zinc salts crystallized from the hot solution in pearly laminæ, the silver salt in fine dendritic crystals. The entire distillate was saturated with ammonia and treated with nitrate of silver; it yielded a beautiful white light crystalline precipitate. This precipitate when boiled became black, probably from a small quantity of formic acid which had been formed, but beautifully white crystals separated from the filtered liquid. The first salt which crystallized was that of the volatile acid of *Viburnum Opulus*, viz. valerianate of silver; the salt which separated from the mother-ley was pure acetate of silver.

The valerinnate was readily separated from the acetate by recrystallization, owing to its sparing solubility. On analysis it yielded—

| | | | | |
|---|---|---|---|---|
| Carbon, - - | 28·65 | 10 = | 750·0 | 28.69 |
| Hydrogen, - | 4·33 | 9 | 112·5 | 4·30 |
| Oxygen, - - | 11·55 | 3 | 300·0 | 11·47 |
| Silver, - - | 55·47 | 1 | 1451·6 | 55 54 |

The acid discovered by Chevreul in the berries of *Viburnum Opulus* consequently occurs likewise in the bark; and the acid considered as distinct by Krämer is identical with valerianic acid.—*Chem. Gaz. from Ann. der Chem. und Pharm.*

## ART. XIII.—A SIMPLE METHOD FOR PREPARING THE PURE SULPHATE OF MANGANIUM FROM THE NATIVE PEROXIDE.

By Mr. Reuben Phillips.

The native peroxide of manganinm is to be pulverised and suspended in water, through which a stream of sulphurous acid gas is to be passed. The same arrangement of apparatus may be used, as would be employed were it designed to generate the hyposulphate of manganium; with this exception, that, there is no occasion for keeping the water containing the peroxide of manganium cool. The sulphurous acid, generated from sulphuric acid, should be made to traverse some vessel containing water, to condense any sulphuric acid which may be suspended in the gas, and also to remove from the gas any hydrochloric acid gas, which may be simultaneously liberated with the sulphurous acid; when the commercial sulphuric acid is used, I send the sulphurous acid through a U tube containing fragments of pumice-stone, which are saturated with water; and I also put some water in the tube, so that the gas may bubble through a verticle inch or two of water. The sulphurous acid is then conveyed into a two-necked bottle, containing the oxide of manganium suspended in water; and through the other neck of the bottle, a stirrer is inserted to prevent the oxide from subsiding.

The sulphurous acid becomes rapidly absorbed in the two-necked bottle, producing the sulphate and hyposulphate of manganium; to transform which latter salt into the sulphate of manganium, the contents of the two-necked bottle is to be transferred to a porcelain vessel, in which it can be boiled for about half an hour; at the end of which time, the hyposulphate will be very nearly decomposed; an excess of

the peroxide of manganium should be used, which entirely prevents the evolution of sulphurous acid during the ebullition. The solution is now to be filtered, and evaporated to dryness; after which it may be gently heated until no more sulphurous acid is disengaged.

The salt thus obtained is very nearly white, possessing a scarcely perceptible rose tint. As I have obtained it, it has a slight acid re-action; this, if required, can be rectified by a second solution, and the addition of a small quantity of carbonate of baryta. The salt contains no metal but manganium. I find the best test for a persalt of iron in a manganium salt to be the sulphocyanide of potassium.—*Lond. Chemist.*

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## ART. XIV.—ON POTATO SUGAR.

By Mr. John A. Spencer.

Wishing a short time since to prepare a specimen of grape sugar from potato starch, and not feeling satisfied with the product obtained by the use of oil of vitriol, in consequence of the sulphate of lime retained in solution, it struck me that if I used an acid whose lime-salt was more insoluble than the sulphate, the product would be improved; I therefore used oxalic acid, and was not disappointed in my expectation.

Four parts of potato starch, twenty parts of water, and one part of oxalic acid, dissolved in water, were boiled together, and in less than ten minutes the mixture, from being so thick, that the vessel which contained it might have been inverted for a few moments without risk of loss, became as thin and limpid as water; the boiling was con-

tinued until a small portion of the liquid, neutralized with chalk and filtered, gave no precipitate with a solution of diacetate of lead, which occupies in general from five to six hours.

The liquid was then neutralized with chalk, boiled and filtered—the filtered solution digested with animal charcoal to deprive it of what little colour it had acquired, again filtered, and the washings of the charcoal added to the solution, which was then evaporated in a water-bath to the consistence of honey, and placed in a warm situation for three or four days, when the whole solidified into a crystalline mass of grape sugar, having a perfectly sweet taste, unaccompanied by any bitterness, while that made with sulphuric acid had a nauseous bitter taste, and crystallized with much greater difficulty.

In addition to the superiority of the product obtained by this process, we have the great advantage of being able to ascertain when the whole of the starch has been converted into sugar, by its giving no precipitate with a solution of diacetate of lead, which shows that the dextrine, into which the starch is first converted has undergone its complete change, and enables us to avoid unnecessary boiling, which destroys its tendency to crystallize, an advantage not afforded by the use of sulphuric acid, because the sulphate of lime retained in solution (however small in quantity) precipitates sulphate of lead, which, though very different in appearance to the compound of gum and oxide of lead, might be mistaken for it in small quantities.

Since adopting the above process, I find that Mr. Graham, in his *Elements*, suggests the use of 1-200th part of oxalic acid, but I have not been able to succeed with anything like so small a quantity.

A mixture, in the proportions prescribed by Mr. Graham, was boiled for fourteen hours and a half; but the liquid, though much discoloured, was not even made limpid, far

less was its property of forming the blue compound, with a solution of iodine, destroyed.

If in time the starch should be converted into sugar, I think its tendency to crystallize would be completely destroyed by the long boiling required.—*Pharm. Journ.*

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## ART. XV.—MEDICAL PROPERTIES OF THE FEVILLEA CORDIFOLIA.

By W. Hamilton, M. D., Plymouth.

Among the other indigenous productions of our West Indian colonies, which the superior attractions of the cane have hitherto kept in unmerited obscurity, the Fevillea cordifolia, or Antidote Coccoon,* claims a prominent place from the value of its medicinal properties.

This is a climbing plant, frequent in waste lands and on the skirts of woods, covering the trees and bushes like ivy, and producing small yellow flowers, which are succeeded by a hard three-celled pome, resembling a calabash, and inclosing about a dozen large round compressed seeds, which, on attaining maturity, drop out through a circular opening in the fruit. These seeds are known by the name of coccoons, and, from the quantity of oil which they contain, are employed by the negroes as a substitute for candles; a number being stuck for this purpose on a long skewer, and the uppermost coccoon ignited.

The whole plant abounds in a bitter principle, which might, no doubt, be advantageously substituted for some

*This production was briefly noticed in vol. xv., page 236 of this Journal. Our readers will now have an opportunity of being further acquainted with its history.—*Ed. Am. Journ. Phnrm.*

of the more costly bitters of the shops; and this bitter principle obtained, in the present improved state of chemical science, in a detached and portable form. Popular opinion accords to the plant itself the merit of being antisyphilitic, emmenagogue, and stomachic. But the bitter principle which pervades all the other parts of the plant, presents itself in a still more concentrated form in the seeds or coccoons, which have, in consequence, been chiefly, if not exclusively, employed in the rude practice of our colonies.

Such is the estimation in which they are held by the Spanish inhabitants of South America, to whom they are known by the name of *avila*, or *avilla*, that they are reputed by them to be worth their weight in gold; and in Brazil, the oil obtained from them by expression is regarded as a sovereign remedy for those rheumatic pains which result from exposure to the cold and dews of night.

The tincture is prepared by macerating eight or ten of these coccoons, scraped and bruised fine in a mortar, in a pint of spirit for two or three days, shaking the bottle containing them frequently, and diluting the tincture with an equal quantity of water. This tincture, in doses of a tablespoonful, is a good stomachic, and counteracts the effects of poisonous fish. According to a numerous series of experiments made by Mr. Drapier, of which an account may be found in the nineteenth number of the *Quarterly Journal of Science*, p. 192, these coccoons are most powerful antidotes to vegetable poisons; and he has found their external application to poisoned wounds equally efficacious.

Of the efficacy of the tincture, prepared in the manner just mentioned, as a hydragogue in the cure of anasarca, a striking case was communicated to the *Columbian Magazine*, for July, 1798, by a gentleman who had an opportunity of witnessing its effect upon a female domestic of his own, who had, as he informs us, "been pronounced by the medical gentlemen in Spanish Town, in a dropsical state, and every thing administered that they thought necessary

in such a case, but all in vain; for, on my subsequent removal to Kingston, I found the swelling much increased in her face, legs, and thighs, with a puffiness in her belly. A planter, from Above Rocks, breakfasted with me; I called the girl to get some water; he was alarmed on seeing her condition, and advised the use of the coccoon or antidote, observing that he had made a perfect cure of a girl in the same state. I proceeded according to his directions, and with the like success; it is now eighteen months since, and thanks be to God she is now in perfect health. I therefore think myself bound to publish the same for the benefit of my fellow creatures."

Such is the unvarnished narrative of the anonymous correspondent of the magazine, which is not the less entitled to consideration, because it comes unsanctioned by the impress of professional authority, and unauthenticated by the celebrity of a name. To the medical reader, the omission of the manner of exhibition is immaterial, since his own experience and judgment in similar cases must be sufficient to guide him, while his professional caution will secure him against the danger of its rash administration.

It becomes, however, worth the trouble of enquiry to determine upon what the hydragogue action of the coccoons depends, and whether the active constituent does not admit of being obtained apart from the rest. By the aid of Chemistry, modern practice is enabled, in most cases, to reduce the bulk, while it augments the activity of the dose. This is especially manifested in the cases of cinchona and opium—in both of which art has succeeded in detaching the active principle from its inert or noxious adjuncts, and presenting it to the patient in a form, if not attractive, at least exciting the smallest possible amount of disgust.

Taken to a larger extent than that mentioned, the tincture operates as an emetic and a purgative. In dropsical cases a wineglassful should be taken every morning fasting, and followed by moderate exercise before breakfast. An in-

fusion in Madeira wine is also a good stomachic. The expressed oil of the coccoon is good for burning, and may perhaps prove useful as an internal remedy in the same cases in which the tincture has been recommended; and from partaking of the same bitter taste with the seeds, it is probable that the same active principle may be found to pervade the whole plant.—*Pharm. Journ.*

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## ART. XVI.—NOTICES OF SOME RARE KINDS OF RHUBARB WHICH HAVE RECENTLY APPEARED IN ENGLISH COMMERCE.

By Jonathan Pereira, M. D., F. R. S.

In laying before the scientific Committee of this Society* some observations on several kinds of rhubarb, not frequently met with in English commerce, I take this opportunity of stating, that I am indebted for the specimens to Mr. Faber, who has on this, as well as on several other occasions, very kindly aided my inquiries, in Pharmacological Natural History, by specimens and commercial information of an interesting and useful kind.

I propose this evening to draw the attention of the Committee to four kinds of rhubarb, which are respectively denominated *Canton stick rhubarb*, *Bucharian rhubarb*, *Siberian rhubarb*, and *Himalayan rhubarb.*

### 1. *Canton Stick Rhubarb.*

Two kinds of rhubarb it is well known, are imported from Canton, the one called *China, East India,* or *half-trimmed rhubarb;* the other termed *trimmed, Dutch-trimmed,* or *entirely-trimmed rhubarb.*

* London Pharmaceutical Journal.

I have recently met with a third sort, corresponding with neither of the kinds just alluded to, and which, on account of its resemblance to the English stick variety, I shall call *Canton stick rhubarb.* It is only recently that this sort has appeared in the market. Five cases of it were imported from Canton, and were sold during the last year by public sale, at eight pence per pound.

All the pieces but one of my sample, are cylindrical, about two inches long, from half to three quarters of an inch in diameter, and weigh each on the average about 100 grains. The piece to which I have referred as forming the exception, is shaped like a flattened cylinder, cut obliquely at one end; its greatest length is about two and a half inches, its greatest breadth two inches and a quarter, while its depth is about one inch, and its weight is about two ounces. Mr. Faber, from whom I received it, tells me, that on the examination of a quantity of Canton stick rhubarb, he found several such pieces.

Most of the pieces are decorticated. These resemble English stick rhubarb in their texture and colour, except that they are, perhaps, somewhat paler, the taste is bitter, and somewhat astringent, but considerably less so than that of good, half-trimmed, Canton rhubarb. By chewing it, little or no grittiness is perceptible.

This kind of rhubarb is probably obtained from the root branches of the plant which yields the usual Canton rhubarb.

### 2. *Bucharian Rhubarb.*

By most writers the term Bucharian rhubarb is employed synonymously with that of Russian rhubarb. But there has long been known in Russian commerce a rhubarb called Bucharian, which is not under the control of the crown, and which, on account of its cheapness, is used in veterinary medicine. Grassmann, an apothecary at St. Petersburgh, considers it to be the rhubarb which, according to Pallas, is obtained from *Rheum undulatum,* and which, in the

*Pharmacopeia Rossica*, for 1798, was denominated *Radix Rharbarbi sibirici*.

I have received from Mr. Faber a sample of a rhubarb which was sent to him in 1840 by a first-rate drug-house at St. Petersburgh, under the name of *Bucharian rhubarb*, and which, he has been subsequently assured, is the genuine Bucharian kind. Some friends of his at Vienna have written to him respecting it as follows: "We now very seldom see Bucharian rhubarb. It used formerly to be brought by Jews into Brody (Gallicia) by the way of Russia, and the Jews of Brody used to supply Germans with it. But the quality being very inferior, and not better than European rhubarb, it did not probably answer."

This kind of rhubarb is intermediate, between the Chinese and Russian or Muscovite rhubarb, but is of inferior quality. The pieces are, more or less, rounded or flattened, and weigh from one to two ounces each. Some of them appear to have been deprived of their cortical portion by scraping, as in the Chinese rhubarb; but in others the cortex has been removed by slicing. Most of them are perforated by a hole apparently for the purpose of drying them; but in none of the holes are there any remains of the cord used in suspending the roots. The holes, moreover, appear to have been cleaned out, as in the Russian rhubarb, for no portion of decayed rhubarb is seen in them. Some of the pieces are dense, but most of them are lighter than good Russian rhubarb. Internally, they are often decayed and dark coloured. Their texture is similar to that of genuine rhubarb. The odour also is like that of rhubarb, but much feebler; the taste is bitter and astringent. When chewed, this rhubarb feels gritty under the teeth. Its colour is darker than that of good Russian rhubarb.

Altogether its resemblance is sufficiently great to the Russian rhubarb to induce me to believe that it, like the latter, is really the growth of the same part of Asia, and probably of the same plant. Calau, an Apothecary in the

rhubarb factory at Kiachta, says, that the Russian merchants barter with the Bucharians for rhubarb in the custom house at Kiachta, but that the selection of the crown rhubarb is conducted in a house appropriated for that purpose on the Chinese borders. Now, as all the rhubarb offered to the agents of the Russian crown must be burnt without remuneration, if not approved of, it is tolerably evident that the Bucharians will offer, for the most part, such kinds only as are likely to pass examination. The inferior sorts, therefore, must be got rid of by some other channels, namely, by private barter or sale. This is the origin, I suspect, of the Bucharian rhubarb which I have met with.

Grassmann, in his account of the varieties of rhubarb found in Russian commerce, describes Bucharian rhubarb as being darker than the ordinary kind. "It occurs," he says, "in heavy, roundish, knobby, perforated pieces, weighing seven or eight ounces each, of a more or less ochre yellow or brownish colour. Its texture is the same as that of genuine rhubarb, its odour strong, its taste bitterish, astringent, and at the same time mucilaginous; when chewed, it feels gritty under the teeth. The older pieces are often hollow and rotten internally. The younger pieces have the same shape as the true rhubarb, but they fetch only one third the price of the Chinese root."

### 3. *Siberian Rhubarb.*

Through the kindness of Mr. Faber, I have also received specimens of another kind of rhubarb, recently sent by another first-rate drug-house at St. Petersburgh to this country, under the name of *Bucharian rhubarb;* but it differs altogether in external appearance from the preceding sort. Three chests of it, the whole quantity imported, arrived in this country in January last, and were sold by public sale on the 27th of February, at sixpence per pound. It is believed that it was bought for exportation.

This rhubarb was packed in the same kind of chests as those in which the Russian rhubarb is usually imported.

I have reason to believe, however, that it is not Bucharian rhubarb; but is the root known in Russian commerce, as *Siberian rhubarb*, and is probably the rhubarb which Grassman calls *Siberian rhapontic root*. Mr. Faber tells me, that, on receiving it, he immediately wrote to the party at St. Petersburgh, who, in 1840, had sent, under the name Bucharian rhubarb, to this country, the rhubarb which I have above described as Bucharian, and described to him the quality of these three chests. The answer was as follows :—"I have no doubt from your description, that those three chests are Siberian rhubarb, sent under another name for objects of secrecy."

Grassmann describes what he terms *Siberian rhapontic root*, as being very readily distinguishable from genuine rhubarb. He says, that it occurs in long, thin, almost cylindrical or spindle-shaped pieces, which have been decorticated and perforated by a hole. Their colour, externally, is pale yellow, internally brownish yellow, or reddish white. Their odour and taste are those of rhubarb but weaker; and though bitter it has but little astringency. When chewed it does not feel gritty.

This description applies, in the main, to the rhubarb imported this year from St. Petersburgh as Bucharian, but which I shall describe as Siberian. In its general appearance it agrees with the rhubarb grown in this country, and known as English stick rhubarb. It has been decorticated, though imperfectly so, as portions of the dark brown cortex are here and there left adherent. The pieces are all more or less cylindrical, seldom exceeding four inches in length and an inch in diameter, and on the average weigh about 100 grains each; the longest piece I have seen is six inches in length and an inch and a half in diameter. The broadest piece is somewhat flattened and about three inches in its broadest diameter. Its colour is in general darker than that of the ordinary rhubarb, but is of the same kind

of tint. Its odour is remarkably sweet, similar to what I have perceived when drying the roots of different species of Rheum cultivated in England. When chewed it is not gritty. Its taste is mucilaginous, bitterish, but not astringent. The fracture of the smaller and sound pieces is similar to that of English stick rhubarb; the larger pieces are decayed, dark brown, rotten, and tasteless in the centre.

### 4. *Himalayan Rhubarb.*

In November, 1840, when China rhubarb was very scarce and dear, nineteen chests of Himalayan rhubarb were imported from Calcutta into this country. The chests were of the usual Calcutta kind, made of the hard, heavy, brittle Bengal wood. The weight per chest was gross 1 cwt. 2 qrs. 26 lbs.

Soon after their importation eight chests were bought and shipped to the Italian markets at 4*d.* per lb.; but finding there no buyers, the residue of the importation remained on hand until September last (though in the mean time the duty was reduced from 1*s.* to 3*d.* per lb.) when a sale for shipment to New York was forced at 1*d.* per lb., covering only part of the rent and nothing more.

Four Himalayan species of *Rheum* are mentioned by my friend Dr. Royle, in his *Illustrations of the Botany of the Himalayan Mountains*, namely *Rheum Emodi*, of Wallich; *R. Webbianum*, *R. spiciforme*, and *R. Moorcroftianum*. Dr. Royle states, that the Himalayan rhubarb, which makes its way into the plains of India, through Khalsee, Almora, and Butan, is probably, from its usual dark colour and spongy texture, the produce of either or both *R. Emodi* and *R. Webbianum;* the roots of *R. spiciforme* and *R. Moorcroftianum* being lighter coloured and more compact in structure.

In my *Elements of Materia Medica* I have described two varieties of Himalayan rhubarb which I have received, the one from Dr. Wallich, and probably the produce of *R. Emodi;* the other from Dr. Royle, who informed me that

it was obtained from *R. Webbianum.* The former appears to me to agree best with the imported Himalayan rhubarb ; indeed, one or two of the pieces of the latter, strongly resemble the sample which I have received from Dr. Wallich.

I have reason to believe that the present is the first shipment of Himalayan rhubarb ever made to this country, and I suspect that the discouraging result will prevent, for the present at least, any further attempts to introduce it—its quality being very inferior, and unfitted for the English market.

The pieces of it vary considerably in size and shape ; some are twisted, cylindrical, furrowed pieces, cut obliquely at the extremities, about four inches long, and an inch and a half in diameter. Others are circular disks, about three inches in diameter, two inches thick, and weighing about four ounces each. Besides these, semi-cylindrical, angular and other-shaped pieces are met with ; and are obviously obtained by slicing the root. Some of the pieces are decorticated, while others are coated. The general colour is dark brown ; the prominent decorticated and paler parts having an ochre brown tint. It has a feeble rhubarb odour, and a bitter astringent taste. When broken, it does not present the marbled texture characteristic of ordinary rhubarb. By chewing it, little or no grittiness is perceived. It is exceedingly light, and is rendered much more so than it probably is in its perfect form, by the porosity which it has acquired from being worm-eaten.—*Pharm. Jour.*

## ART. XVII.—ON THE STATE OF PHARMACY IN MEXICO.

In the 13th Number of Travels and Descriptions of Countries, by Widenmann and Hauff-Cotta (1837, p. 67,) are contained, a few observations on the State of Medicine in Mexico. In reading these through, and more especially in perusing the description of the proceedings of the government against quacks and unlicensed vendors of Medicines, every honest Pharmaceutist must wish to see this class of men treated in the same way in every other country as in Mexico.

The medical authorities in Mexico, are annexed to the Ministère de l'Intérieure. The *Protomedicat*, as it is termed, consists of a President, a Dean, a Fiscal, and five members, all Doctors of Medicine, with a secretary and an usher.

Their duties consist in superintending the examinations in Medicine; in the inspection of the conduct of all medical men; to see that they confine themselves to the legal limits of their profession; in the direction of medical studies; in the inspection or visitation of the Apothecaries' shops; in the direction of the Medico-political measures in case of epidemics; in putting the laws into execution against quacks and unlicensed vendors of medicines of every description, who are to be rigidly prosecuted, and, in case of conviction, punished with fines, banishment, or imprisonment with hard labour;* lastly, in sending in monthly reports of the state of health of the previous month to the government, the reports being themselves founded on the observations and notes to be forwarded by all medical men in actual practice to the Protomedicat on this subject.

The Medical men are arranged under the usual heads of Physicians and Surgeons, (the two classes being rigidly distinct,) Accoucheurs and Apothecaries.

* A plan which would answer very well in all other countries.

Physicians must be graduated Doctors of Medicine, but before they are permitted to practice, they must pass an examination (state examination) before the Protomedicat. If they are found duly qualified, they are bound by their oath to act in every case according to the best of their abilities and their consciences; to abstain from the performance of all surgical operations, unless they have passed the examination in surgery also, and not to prepare or dispense* medicines, much less to keep an apothecary's shop; further, not to take their own relations—even the most distant—under their treatment, to attend the poor gratis, to be content with moderate remuneration from the rich; and lastly, to promote the fulfilment of all religious duties on the bed of sickness and death, or they subject themselves to a fine of 10,000 maravedis (about forty piastres) for each case, in which one of their patients, by their neglect, dies without having received the sacrament. The law holds them, moreover, responsible for every culpable neglect of the duties of their profession.

The apothecaries are, in the first place by law, subjected to a rigid examination, and then to a periodical visitation of their shops, beyond the precincts of which no medicines are allowed to be prepared.

They are bound to reject all prescriptions not signed by a legal practitioner, to abstain from all medical and surgical practice, and never to quit their shops without leaving an approved and duly qualified substitute.

All their assistants must be acquainted with Latin, and capable of compounding medicines accurately and quickly, according to prescription and the directions of the Spanish Pharmacopœia. No one is permitted to open a shop or to take one, in a place where his father or father-in law, son or son-in-law are established in medical or surgical practice.—*Chem. Gazette, from Correspondenz-Blatt für Süd-Deutschland.*

*Then there are no dispensaries in Mexico! Happy land.

ART. XVIII.—FALLACY OF DR. BIRKBECK NEVINS' TEST FOR ASCERTAINING THE PURITY OF DISULPHATE OF QUININE.—By G. M. Mowbray.

The following test has been suggested by Dr. Birkbeck Nevins, as appropriate for readily ascertaining the purity of disulphate of quinine.

"To one or two grains of the suspected salt add three or four drops of sulphuric acid in a white evaporating dish and twice as many drops of water; if the salt contains either starch or fatty matters they will remain, whilst if they are absent the whole will be dissolved. Let heat be next applied to the solution, and as it becomes concentrated, the acid will char any sugar which may be present, which will be indicated by a black stain round the edge of the solution, and the whole will speedily assume the same color."

Allow me to submit, that this test is valueless, and for the following reasons: Dr. Nevins appears to have overlooked a fact well known to chemists whose investigations have been directed to organic compounds, that salts may be readily recognised as belonging either to the organic or inorganic class, by heating on platina: if the compound under examination, after heating, yield a carbonaceous residue, then it belongs to the former class; if a whitish ash be left after ignition, then an inorganic compound has been acted upon. Now, Dr. Nevins directs us to add sulphuric acid to the disulphate; the effect of this is to convert the salt into the soluble sulphate, and on the application of heat, this soluble sulphate, in common with all organic salts, is decomposed, yielding a carbonaceous residue.

Could Dr. Nevins have shown, that which is opposed to all experimental results with organic compounds, that in the presence of sulphuric acid quinine is not readily carbonized—and the reverse of this is the fact, as may readily be ascertained by heating a crystal of the soluble sulphate by the side of a sample of quinine purposely adulterated with sugar or gum—his test might be so far admissible; but as Dr. Nevins has not shown this, and it cannot be shown withal, therefore his test is fallacious.—*Med. Gazette.*

# MISCELLANY.

*Chemical Examination of several species of Meloe.* By J. Lavini and M. Sobrero.—The fluid which the several species of *Meloe* excrete when touched has, as is well known, a similar effect to cantharides. It has long been the custom to submit the living animals to pressure in Sardinia, and to employ the expressed fluid when mixed with fat to form an epispastic ointment.

The authors exhausted the coarse powder of several species which occur in Piedmont (*M. violaceus, M. autumnalis, M. Fucia, M. punctatus, M. variegatus, M. scabrosus, and M. majalis,*) first with boiling water, and then with alcohol and æther. The aqueous solution, which possessed acrid properties, was evaporated to the consistence of a thin extract, and then treated with æther. The solution was colourless, and deposited on spontaneous evaporation white prismatic crystals, which were identical with cantharidine. When pure, they were insoluble in water, soluble in æther, especially when boiling, in alcohol, sulphuric acid, nitric acid, solution of potash, but insoluble in muriatic acid. They also dissolved in acetic acid, especially on the application of heat, a property which likewise belongs to cantharidine. They fuse, when heated on platinum foil to 410°, giving off white vapours; at a higher temperature they are decomposed and burn with a white flame, leaving a readily combustible cinder. The analysis yielded 61·77 per cent. carbon, 6·30 hydrogen, and 32·53 oxygen, results which agree sufficiently with those of Regnault, obtained in the analysis of cantharidine.

The powder which had been exhausted with water, and from which the æthereal extract had been obtained, yielded a small quantity more cantharidine, a green oil easily soluble in alcohol and æther, which possessed acid properties, expelled carbonic acid from the alkaline carbonates, and formed soaps with them; moreover, a yellow oil, soluble in æther, but almost insoluble in alcohol; and finally a white volatile substance, crystallizing in warty masses and soluble in very dilute alcohol. When the substance which had been treated with æther was extracted with alcohol, it yielded mere traces of the substances soluble in æther, already mentioned.—*Chem. Gaz. from Journ. de Pharm. et de Chim.*

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*On Tamarinds* (*Tamarchinti.*) By X. Landerer, of Athens.—Every Pharmaceutist knows that the tamarind pulp of commerce is contained in a broad pod of the length of a finger, with three or six indenta-

tions. These pods are opened in Arabia, the native country of the tamarind tree; the pulp is there removed, trodden down in a kind of wooden tub, and afterwards formed into roundish cakes, weighing from fourteen to sixteen ounces, and dried in the sun. In this state it is brought to Cairo, where it is sold, the trade not being a monopoly of the viceroy. Even in Egypt all the pulp sold in cake is regarded as adulterated, so that the higher classes purchase only the unopened pods for use. The quantity of tamarind pulp brought into the market of Cairo and Alexandria, varies from 8 to 10,000 cwt., reckoning the cwt. at 36 okkas.—*Pharm. Journ. from Rep. für die Pharm.*

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*On Senna.* By X. Landerer, of Athens.—The senna plant is chiefly indigenous in Ethiopia, Arabia Felix, Abyssinia, Nubia, and Sennaar. The Arab tribes who occupy themselves with this branch of commerce pay not the slightest attention to the cultivation or management of the plants. The senna plant attains the height of eight or ten feet, and affords some protection against the heat of the sun to the inhabitants of the desert and to the caravans. The harvest of senna begins about the end of September. The Arabs then cut nearly all the branches off the tree, leaving the stems bare, and allow them to lie exposed until the leaves begin to fade. The branches are now collected in bundles and exposed on high ground or rocks that the air and sun may dry them as quickly as possible. When the leaves are dry the branches are laid in heaps and beaten with sticks to shake the leaves off. The leaves obtained by this process are not damaged, and consequently fetch the highest price, amounting to about double the sum given in the bazaars for the broken senna. As all the leaves are not separated from the twigs by this process, the branches are, in some parts of Nubia, placed on a clay floor and camels are driven over them to effect the total separation of the leaves, which are by these means broken into pieces and found mixed with small portions of the twigs.

Another variety of senna, characterised by the large size of the leaves and their green colour, is brought from the interior of Africa. It is sold at a high price by the name of *Mekka senna*.

The senna (*sinamiki*) collected in various parts of Africa, is packed in linen sacks on camels and conveyed by caravans to the shores of the Nile, where it is transferred to the boats, and thus brought to Cairo and Alexandria. In these two capitals there are sinamiki magazines, to which the bales are conveyed to be unpacked and again carefully sorted.

Within the last two years the senna trade has been thrown open, but it has latterly again become a government monopoly. The refuse and

dust generated by the sorting of the leaves is not met with in the European markets, as it is kept for home consumption. An intentional adulteration of senna with other leaves in their native country is out of the question, for the slightest adulteration is there punished as a capital crime. The small pods, which are rarely found mixed with the leaves because they are carefully picked out, are in very general use in the countries where the senna grows. In the bazaars of Constantinople and Smyrna two varieties are met with—an Egyptian and a Tripolitan variety.—*Ibid.*

*Transparency of Quicksilver.*—M. Melsens has found that quicksilver in minute globules is transparent, and transmits a blue light slightly tinged with violet. These globules are formed when a fine stream of water is dropped on a mercury-bath; the drops of water, in consequence of falling with some force, become covered with a thin pellicle of mercury, which present the fact here stated. The result has been verified by Arago.—*Chem. Gaz., from L'Institut.*

*Experiments on the Milky Sap of the Cow-Tree.* By Heintz.—It is now a considerable time since the milky sap of the *palo de vaca* was examined by Messrs. Boussingault and Mariano de Rivero, who found it to contain water, wax, a substance identical with animal fibrin, sugar, and a magnesian salt, free from acetic acid.

Since the experiments of these philosophers, M. Solly also made several imperfect experiments on this liquid, according to which he discovered water, a resinous or waxy substance, gum, saline substances, probably acetate of magnesia, gluten and albumen.

Five years ago many experiments on the same subject were published by M. Marchand. This chemist found, in the sap that came from the Caraccas, water, sugar capable of fermentation, lime and magnesia in combination with phosphoric acid, traces of acetic and butyric acids, a substance resembling caoutchouc, and various resinous matters.

We have now before us a statement of new experiments, made by M. Heintz, on different samples of the milk of the cow-tree. According to this author the sap contains 42.7 per cent. of solid substances, that is to say—

| | |
|---|---|
| Water . . . . . | 57.3 |
| Vegetable albumen . . . | 0.4 |
| Waxy matter . . . . | 5.8 |
| Resinous matter . . . | 31.4 |
| Gum and sugar . . . | 4.7 |
| Fixed salts . . . . | 0.4 |

In a sample of damaged sap, M. Heintz also discovered traces of bu-

tyric acid. The ashes of the sap contained soda and traces of potash, in combination with carbonic and phosphoric acids. In addition to these substances, there were magnesia and a small quantity of lime.

These results are nearly the same as those at which the predecessors of M. Heintz had arrived. This chemist analysed, with much care, all the resinous or waxy substances he found in the sap; but it appears unnecessary for me to give the formulæ he calculated, for they are completely arbitrary, and do not apply to definite compounds.—*Chemist*.

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*On the Composition of Linseed Oil and its Products, by Oxidation.* By Dr. F. Sacc.—The conclusions drawn by Dr. Sacc, from his experiments on linseed oil, are, that this substance consists of *margaric acid* and *oleic acid*, combined in equal equivalents with *acroleine*. By oxidation with nitric acid, we obtain margaric acid, oxalic acid, suberic acid, pimelinic acid, carbonic acid, and water.

The oleic acid of linseed oil differs in composition from the oleic acid of other fatty bodies; the formula of the anhydrous acid is $C_{46}$ $H_{38}$ $O_5$. The margaric acid of linseed oil is identical with that of other fatty bodies, its composition being $C_{34}$ $H_{33}$ $O_3$. The glycerine, which is obtained in great quantity from linseed oil, is also similar to that procured from other fats.

By oxidation, the oleic acid yields suberic acid, which again is decomposed into a volatile fatty substance.

The pure margaric acid yields on oxidation succinic acid, but no suberic acid or pimelinic acid.

The pimelinic acid is formed, by a transformation of the suberic acid when succinic acid is present. There exists a peculiar fatty substance of very singular properties, forming the link between the oleic acid and the suberic acid.—*Pharm. Journ. from Ann. der Chem. und Pharm.*

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*On the Yellow Colour which the Unguentum Iodidi Potassii acquires by keeping.* By Kallhofert.—1. I melted the fat obtained from the viscera of a recently slaughtered pig in vessels of silver, platinum, iron, tin, glass, porcelain, and in glazed earthen vessels, but observed that all the specimens thus prepared bore the same relation to iodide of potassium. All the ointments thus prepared, remained perfectly white during the first four days; but after the lapse of ten days, assumed a yellow colour.

2. Ung. potassii iodidi, when perfectly white, instantly turned yellow on addition of a few drops of the essential oils of lavender, thyme, cloves, and more especially of valerian and cinnamon.

3. Hogslard one ounce, which had been melted about a fortnight previously, gave, with one drachm of iodide of potassium, and six grains of carbonate of magnesia, an ointment which became yellow and puffy whilst it was being rubbed down.

4. I prepared an ointment of one drachm of iodide of potassium, and fifteen grains of carbonate of magnesia, and one ounce of hogslard, melted twenty days previously, and kept in a well-closed pot. In fifteen hours the cap burst, and the ointment was scattered about, appeared yellow, puffy, and woolly, and showed very little activity when applied to sensitive portions of the skin.

5. One drachm of iodide of potassium, 15 grains of levigated chalk, and one ounce of hogslard (melted twenty days previously.) The ointment thus prepared was but slightly discoloured in a fortnight, but appeared to have little activity.

6. One drachm of iodide of potassium, four grains of potassa fusa, and one ounce of old hogslard. In twenty-seven days this ointment was but slightly discoloured, and is tolerably white at present, three months after its preparation.

7. ℞ Olei de Cacao
Ceræ Albæ
Ol. Amygd. *ana* ℥ss.
Potassii Iodidi, ℈iv.
Boracis Venet.
Aq. Destill. *ana* ℈j.
Ol. Rosar. gtt ij. M. ft. Ung.

This ointment is now at three months from the date of preparation unchanged.

8. ℞ Cetacei, ℥ss.
Ol. Olivæ ʒvi.
Ceræ Albæ ʒij.
Potassii Iodidi, ℈iv.
Ol. Citri.
Ol. Rosar. *ana* gtt iij. M. ft. Ung.

Is at present, three months since it was made, not perceptibly yellow.—*Pharm. Journ. from Pharm. Central Blatt.*

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*Adulteration of Iodine.*—M. Herberger draws attention to the fact that with the present high price of iodine sophistications are uncommonly frequent. Thus he found in one sample native sulphuret of antimony. But the adulteration with artificial graphite is far more deceptive; it may, however, be readily detected by driving off the iodine at a gentle heat, and subsequently raising the temperature with access of air.

In one instance the author found no less than 51 per cent. of graphite.—*Ib. from Jahrb. für Prakt. Pharm.*

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*Pyrophorus from Tartar-emetic.*—A very dangerous pyrophorus may be produced by igniting tartar-emetic in a closed crucible. In some experiments to prepare pure antimony in Prof. Wackenroder's laboratory, several ounces of tartar-emetic were submitted to a slight calcination. On emptying the carbonaceous residue, which was still somewhat warm, from the crucible into a dish, it took fire in a few minutes, probably by being breathed upon, and was then suddenly projected about the laboratory, forming a shower of fire.—*Chem. Gaz. from Archiv der Pharm.*

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*Observations on the Ferrocyanide of Potassium*—As the ferrocyanide of potassium is decomposed on ignition, into cyanide of potassium and iron, Liebig has assumed, that on igniting animal charcoal potash and iron, cyanide of potassium alone is formed, and that this is converted into ferrocyanide of potassium on extracting the ash with water. If the finely-powdered fused mass is digested with spirit, but little cyanide of potassium is obtained; on the other hand, on exhausting it with hot water, ferrocyanide of potassium is immediately obtained, and indeed to the same amount as when procured from the ash in the ordinary way. If the formed cyanide of potassium were capable of dissolving iron, the iron extracting-pans ought to be considerably attacked, which however is not the case, as they frequently last more than ten years.—*Ib. from Poggendorff's Annalen.*

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*On the Preparation of Hyposulphite of Soda.* By M. V. Legrip.—The author gives the following as a good and cheap process for the preparation of hyposulphite of soda, now so extensively employed in taking Daguerreotype images:—

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|---|---|---|
| Take of | Subcarbonate of soda . . . | 730 parts |
| | Sulphur . . . . . | 45 " |
| | Water . . . . . | 1500 " |

Mix the sulphur first, with a small quantity of the water, and then add the soda dissolved in the remainder of the water. Introduce the mixture into two two-necked bottles, which shall not be more than two-thirds filled, then,

| | | |
|---|---|---|
| Take of | Clean iron filings . . . . . | 1,500 parts |
| | Sulphuric acid, (sp. gr. 1.845) . . . | 3,000 " |

Put these into a flask capable of holding two or three times the above quantity. Allow the mixture to cool, and the first portion of disengaged hydrogen to escape, then place the flask on a sand-bath, and by means

of tubes of rather large diameter, convey the gas, first into a washing bottle, and then through the two-necked bottles containing the solution. The heat applied to the flask should be gradually increased, so as to produce a regular, but not too rapid evolution of gas.

The process having continued thus for ten or twelve hours, may be stopped. The solutions contained in the two bottles are to be mixed together, filtered, and evaporated, so as to yield crystals of hyposulphite of soda.

The flask will contain sulphate of iron, which may be dissolved out and crystallized.—*Pharm. Journ., from Journ. de Chimie Med.*

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*Note on the Origin of East India Kino.*—A communication was read from Dr. Royle with reference to the origin of East India kino. Several conflicting opinions having been expressed by Pharmacologists as to the tree which yields this product, Dr. Royle and also Dr. Pereira have for some time been endeavouring to procure authentic information on the subject. Dr. Royle has at length succeeded in ascertaining, from undeniable evidence, that East India kino is an exudation obtained from the *Peterocarpus marsupium.* He has also received an account of the manner in which it it is collected, which account has been furnished by Mr. J. Brown of Anjara Kandy, on whose estate the whole of the Kino brought to this country is said to be produced.

The substance of the communication was only briefly stated to the meeting, as the paper was intended for the Scientific Committee, and it will therefore be brought forward at a subsequent meeting in a more mature form.—*Ibid.*

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*Duflos' Method of Purifying Crude Hydrochloric Acid.*—MM. Hensler and Riegel have tried this method, and found it to answer well.

Mix fifteen pounds of crude hydrochloric acid with five pounds of water and one ounce of sulphate of iron; expose the mixture to the air for some time, and when clear pour it into a retort, and distil, at a moderate heat, three-fifths or three-fourths.

The product of distillation is clear, colourless, of a proper degree of concentration, and quite pure. In the neck of the retort a yellowish white sublimate will be observed.—*Ibid, from Pharm. Central Blatt.*

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*On the Portion of Opium which is Insoluble in Cold Water.*—By Stanislaus Martin.—It is a very general opinion that water extracts all the active constituents from opium; but M. Martin has observed the residue of opium, which is insoluble in water, if subjected with sugar and yeast

to fermentation, will yield still a very narcotic preparation. He found in the residue remaining in the preparation of the aqueous extract of opium, and of the acetate and muriate of morphia, *brown extractive matter, narcotine, fatty oil, resin, caoutchouc, bassorine*, with *a gum-like substance, sulphate of lime, &c.*, with *vegetable fibre*. One part of this residue of opium, which is insoluble in cold water, was mixed with 175 parts of sugar and 40 parts of yeast, and exposed to a temperature of 77° Fahr. When fermentation had ceased, and the fluid had become clear, it was filtered and evaporated in a water-bath to dryness. The extract was again dissolved in water, and subjected with sugar and yeast again to fermentation, then re-filtered and evaporated. *This fermented extract of opium* is of a brown colour, and has a peculiar aromatic odour and bitter taste, producing a sensation of warmth on the palate. Two centigrammes of this extract produced narcotism with head-ache in a strong man, and in a second experiment vomiting ensued. A dog of moderate size was killed by one gramme = 16 grains. This subject is worthy of further examination.—*Ibid, from Reper. für die Phvrmacie.*

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## MISCELLANY.

THE

# AMERICAN JOURNAL OF PHARMACY.

JULY, 1846.

## ART. XIX.—ADDRESS TO THE GRADUATES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

Delivered April 15th, 1846.

By Joseph Carson, M. D., Professor of Materia Medica and Pharmacy.

Gentlemen,—We are convened on the present occasion that you may receive publicly, at the hands of the officers of this institution, the testimonials of qualification to engage in the exercise of your profession, and by this act, to sever the bond by which hitherto you have been united to them. From their control and authority you are now to be dismissed, and it becomes obligatory upon them, in receiving you as equals and associates, to impress upon you a proper comprehension of the obligations you assume. Permit me, therefore, as the organ of my colleagues, to engage your attention for a brief period, with the effort to set before you the principles of action that should regulate your future conduct.

It need hardly be urged, at this time, that the career, upon which you have entered, is one of the highest responsibility; for in addition to that which must unavoidably devolve upon you as citizens, as members of a civilized, refined, and Christian community, there is another which is of your own assumption, and which you can neither evade nor

shrink from—the responsibility of a profession, liberal in its pursuits, and intimately associated with the welfare and happiness of fellow beings. To prosecute successfully the duties of this profession, must be the ardent aspiration of each ingenuous mind, as in it are involved reputation, station in society, competency and influence—the most desirable acquisitions which man can covet, and from which eminently originates the power of usefulness.

In aiming at success, however, correct and definite ideas should be entertained of its nature, and the means of its accomplishment; for to enter upon the voyage of life without them, would be as senseless as the expedition of the mariner to distant lands, without a thought of where they lie, and destitute of the ordinary helps of navigation. The rocks and whirlpools that are placed in the track of every man's existence, are numerous and deceptive; and ere he may be aware of their proximity, the bark, so richly freighted with his resources, may come upon them, the victim of his heedlessness and folly. To the honourable and exalted spirit, all success is not desirable. Where genuine and legitimate merit can be found, *there* must exist also the spurious and counterfeit. Success, the offspring of unsettled principles, unsteady purposes and springs of action, must necessarily be ephemeral and evanescent, because entirely destitute of sustaining basis. The materials that constitute it are valueless and fictitious. It may pass for true, as gloss and polish may be given to its surface, but is destined to reveal its real essence, by soon becoming dull and tarnished. That alone which originates from a determinate plan of operation, in which the objects of attainment have been properly appreciated, where motives both laudable and substantial constitute the ground work, can prove durable and satisfactory.

It is moreover an undeviating law of nature, trace it where you may, that formations of rapid growth are proportionably unstable, while those that are tardy in the at-

tainment of their full dimensions, and acquire but slowly their strength and vigour, are firm and unyielding. The same rule is applicable to the results of human enterprise, in which category may be ranked professional success.

The first and most important requisite of success, is adequate preparation to perform the duties appertaining to the pursuit that may have been selected. This would seem to be a self apparent truth ; but by no means are its full force and cogency appreciated. Indeed, if there be an evil prevalent in our own day and generation, it is the assumption of duties and responsibilities, for which there is no fitness from previous training—physical, moral, or intellectual. The presumptuous mind of man is undismayed by ignorance and incapacity, and urges to the arrogation of trust and confidence on the part of the community, to which there can be given not even the shadow of a title. In the mechanical arts, and those that can be comprehended by the majority of mankind, such arrogance can be detected, and invariably brings upon the individual who ventures upon its adoption, contempt and ridicule. But beyond the pale of the class alluded to, there exist numerous occupations of which the public have not the means of rightly judging, of which no correct or adequate opinion can be formed ; and in which, for a time at least, faith is accorded to bold pretensions and unhesitating promises. *Charlatanry*, gaunt, lean, hideous charlatanry, stalks untrammelled throughout the land, assuming forms and hues forever varying, in accordance with the depraved and vitiated taste for novelties; and like an evil spirit seeking a resting place, but finding none, invades the precincts of many an honourable and necessary calling. Wealth may be accumulated by it, but all the gold of Ophir could not disguise the degradation of its nature. I may then insist upon it as a proposition neither to be overthrown nor controverted, that nothing but a thorough knowledge of the pursuit, which is to constitute the business of life, can give the skill that is adequate for its successful prosecution.

The occupation which you, Gentlemen, have chosen, is Pharmacy. It is no ordinary one. It deals not with the gross materials of which this earth is fashioned, but is occupied with the rarest and most subtle products derivable from the vast storehouse of Nature. It employs them not to please the senses, to enhance the zest for external indulgence, to cast around existence a halo of pleasureable perceptions, and to gratify those tastes which elevate the human character; but applies them to meliorate the ills that are inseparable from our frail and perishable organization. It serves not man in vigour, hope and high enjoyment, but comes to him when prostrate and helpless, and, like an angel of mercy, bids him not despair. It is devoted to soothing the anguish of the body, and quiets the fears and apprehensions of the mind. Surely it is no ordinary occupation.

Nor is it one of easy acquisition. Extensive information is required to qualify the candidate for public confidence. A vast array of facts must be crowded on the memory, through which the eye of science must penetrate, to adjust and understand them. The perceptive faculties must be sharpened, the mind aroused in the observation of phenomena, the judgment cool and nice in its discrimination. The substances, with which the pharmaceutist must unavoidably manipulate, are full of good, or capable of irreparable injury. He may be the instrument of restoring to health the sufferer, and bestowing happiness upon himself and family, by faithfully and dexterously performing the task assigned him; or he may ruin both, by the committal of an error. To master all the details of the pharmaceutic art, to become an adept, efficient, safe, and trustworthy, requires a long apprenticeship, a profound and systematic course of study, and instruction in several branches of natural and physical science. Surely then it is not an easy occupation.

Your novitiate has been well accomplished; you have

taken advantage of all the facilities presented to you, for adequately preparing yourselves to fill your high office. You now go forth, trusting solely to the character you have earned, and are about to engage in a struggle for preferment—a struggle which will call forth all the abilities of which you are possessed, and which will be arduous and protracted. Your training for the effort has ceased; your starting point is from this place, and from this moment. With so auspicious an entrance upon the course before you, much will be expected from you, and undoubtedly much will be accomplished by you.

A second requisite of success, consists in the adaptation of the talents that may be possessed, and knowledge that has been acquired, to the circumstances by which the individual is surrounded. No reasoning is necessary to be convinced, that the affairs of this world are not stationary. Demonstration is given on every side, that its whole surface is mobile. Time moves on, and carries with it the mass; not directing it into one channel, but breaking up and separating it into a multitude of currents. Progression is inseparable from our condition, a wise provision of our Maker, by which in his scheme of direction and government, the state of mankind is improved and elevated; and stagnation of all noble qualities prevented. The world as it was originally, and as it now is, presents aspects so diversified and so discrepant, that it would be impossible to understand the connexion, were we not familiar with this all powerful, eternally operative law of creation. It applies to every thing, and the idea of quiescence is not only unphilosophical, but unnatural.

With this mutability in the events of life, the mind of man is wonderfully in unison; active, restless, and unsettled, it perpetually seeks to expend its energy in new and unexplored directions. To be passive is to retrograde.

Among the older nations of the earth, the changes that are entailed are not as perceptible as they might be, because

so gradual in their production; as in heavy bodies, the *vis inertiæ* is greater which controls them; yet by comparison they become apparent, and revolutions in public feeling, in government, in the arts, in science, and in literature, are steady and unceasing. In a land like that in which we dwell, among a people constituted as our own, fixedness of thought and action is not to be expected, transition is every where in operation. Augmentation in power, in resources, in intelligence, in influence is rapidly progressing; and full maturity cannot be attained, until the elements that serve to nourish enterprise, have been all developed. To the young and enthusiastic, positive as are the advantages of such a state, yet numerous are the difficulties and dangers. Eagerness for advancement, miscalculation of measures for its attainment, imprudence in the adoption of such as are uncertain, and improvidence in the expenditure of means which should have been most carefully husbanded, have been the causes of many a failure. Moderation, caution, self-control, and forethought, are qualities absolutely essential. I wish not to be misinterpreted, however. I am the advocate of no timid policy, no wavering line of conduct; a decided course alone can be successful. I only wish earnestly to enjoin discretion, and point to it as a polar star, steadily to be kept in view amidst the favourable winds and currents of circumstance, by whose aid the destiny of every human being is determined.

To you, an extensive field of enterprise is opened. A wide-spread country, a growing population, industry, frugality, and information diffused in every quarter, are especially fitted to abet your exertions. You cannot remain in supineness and inaction, and claim the apology of want of opportunity. All around you is in a state of activity; and lost to a sense of propriety or shame must he be, who becomes imbued with no kindred impulses; and still more imbecile and worthless he, who cannot appropriate to himself some passing chances to advance his fortunes. Your pro-

fession is a thriving one; its future prospects are most encouraging; it has within itself resources to gratify any reasonable ambition; and you may either reap the harvest which is sure to follow right endeavours, or leave it to be secured by others, whose courage, energy, and perseverance entitle them to gather it.

Another requisite for success, depends upon a sedulous and irrepressible devotion to the objects which seriously occupy the attention. Happily enthusiasm has been extensively implanted in the soul, and few are so formed as to be without it. When restricted to its peculiar limits, it enhances much the pleasure, and adds greatly to efficiency in the performance of respective duties; in fact, without it, even mediocrity can hardly be attained. But I may advance one step farther, and assert, that from this principle originates all improvement. Without it, inquiry would languish; and ingenuity, unexcited to legitimate exercise, would be expended upon trifles. Nothing great, nothing good, has been accomplished without the infusion of an enthusiatic feeling, which has led to the removal of difficulties nearly insuperable, and brought forth discoveries the most remarkable. Genius must be aroused by it, or genius must lie dormant and profitless. In every department of knowledge, it has been the impulsive instrument of extension; for the love of knowledge and discovery alone, would prove of little service.

Enthusiasm bestowed spirit and animation upon the researches of Newton, cold and abstract as they may appear to an ordinary observer. It kept the metaphysical mind of Locke upon the stretch to fathom the depths, and unfold the operations of the human intellect. It stimulated Cuvier in the exploration of the external forms and modifications presented on the surface of the globe, and aided him in building up a system of arrangement before unequalled. It so completely possessed the control of Davy, as to render him untiring in his labours. And it sustained Champolion

amidst the burning sands of deserted Egypt, and enabled him to proclaim the true signification of the hieroglyphical records. These are but a few bright and illustrious examples. In every branch of science, moral, speculative and natural, many, almost innumerable, others might be instanced.

But I must not wander beyond the domain of our own peculiar department, as it affords us ample room for illustration. What applies to the exercise of the more exalted gifts of understanding, and the most striking objects of investigation, applies equally to less eminent endowments, and to subjects that are less notable. The history of Pharmacy, from the period at which the Alexandrian school existed, when it was erected into a distinct branch of medical science, to the present time, is teeming with the evidence by which our declarations may be sustained. I need not detail the stages of its advancement, or indicate the steps in the course of progress that have contributed to place it on its present footing; the bare mention of the names of Gaubius, of Glauber, of Silvius, and Lemery, of Gay Lussac, and Vauquelin; and in our own day of Derosne, of Pelletier, and Caventou, of Guibourt, and Virey, and many, very many others, will bring at once into the memory the vast array of services they have rendered to it.

Yet this ardour in the cause of pharmacy has not been confined to our transatlantic brethren. Their spirit has been shed abroad, and we have been benefitted by its diffusion. Trace the progress of the science in our own country, and it will be found that the same efficient principles have been in operation. Look at the improvements that have been introduced on every side, at the efforts that have been made to extend and increase information, to elevate the standard of proficiency, to present the means of education, and preparation for its practical duties; and conviction must follow that carelessness and indifference to our own well being have not restricted our endeavours. And who

have been the efficient agents in this good work, this, to them, labour of devotion and of love? Enlightened, public spirited men, who were not willing to be behind the age, in what might profit their generation and those to follow them. I cannot praise the living, but it may be permitted me to give a passing tribute of acknowledgment to the departed. Our Association, this College, whom, within our own recollections, has it lost worthy of being held up for imitation? one, young in years, but old in services; for us too early called away, and yet not leaving us without the deeply fixed impression on our minds, that he was our benefactor. In alluding to the late *Professor Fisher*, I am aware a train of melancholy reminiscences is awakened, a chord of feeling is touched which vibrates sympathetically in the bosom of all who knew him. Around me are his friends and his associates, and they have deeply felt and well appreciate his worth; for to the heart of every one with whom he came in contact, his quiet, gentle and conciliating deportment found its way, and lasting attachment was the consequence. For evidences of his zeal, his energy, his untiring interest in the cause of his profession, I refer you to the pages of our own and other journals, where his contributions may be found, the monuments of his labours. He was taken from his place among us, and left a void in our affections, but his name will still be cherished, and may its hallowing influence hover round us, and prompt to deeds of emulation. Like the green blades and flowers which each spring arise from his premature grave, to show that all is not cold and lifeless where he lies, may our annual efforts for the promotion of our science testify conclusively that his precepts and his example have not been lost upon us.

But I am again impelled to call up commingled recollections of pain and pleasure, inseparably connected with this School of Pharmacy. An individual, once a member of our body, prominent with others, was among the first in his endeavours to promote its successful establishment. In

this country it was a new and untried undertaking, but the success with which it has been crowned, has long since clearly exhibited the advantages expected by its founders. A foresight of the future, an anticipation of the growing wants of the profession, the necessity of preparation to meet the demands of the community, originated the enterprise. But it required unceasing vigilance, inexhaustible perseverance, wide spread influence and unwearied personal attention. For all these our lamented *Vice President Troth* was distinguished; he boldly took his stand in favour of improvement, and no difficulties drove him from his path, no disappointment diminished the firmness of his determination to accomplish it. His hope was high, and he had the faculty of infusing it into all within his circle. His manly bearing, his practical intelligence, his tones of encouragement, and decided liberality, communicated power, and it was wielded for the advancement of this his favorite project. In speaking of him thus, I detract nothing from the merit of those who stood by him, and aided him. I praise him because he is no longer with us; and bring his deeds before our minds, because it is a melancholy enjoyment to dwell upon his memory, more especially in connexion with the present ceremonies, in which so often he stood conspicuous. His mantle is among us, and will continue to cover, I trust, many an eminent successor. I have selected these examples, because I have been intimately associated with them. They might well be multiplied, but my observations must be restricted, and my design of exhibiting worthy characters for emulation has been accomplished.

Gentlemen, the remarks that have just been made with reference to the leading master spirits of your profession, are applicable to yourselves. Your zeal and devotion to it are not to be confined within the narrow limits of your own advantage, to the every day details which have no other end than the promotion of self gain. Sedulous must you be in all particulars; attentive to the interests of those who repose confidingly upon you, ever ready in the discharge of

demands which are imperative; but in addition, a debt of gratitude weighs upon you, an obligation to return in kind the benefits you have received from the labours of your predecessors and cotemporaries. I mean, that you should exert yourselves, so far as talent has been conferred, to still continue the improvement of your profession. I will not occupy your time by specifying the mode by which this can be accomplished. The means are known to you, or will in the course of your experience become familiar, but simply wish to impress the fact upon you, that at the present period an extensive field of research and observation is presented in the projected revision of our *National Standard;* a labour in which all, who can do so, should engage, and thus exhibit by what close ties of fellowship we are united.

The last requisite on which I shall insist is strict integrity. In every code of morals, the teaching is the same with reference to this point, and the advantages of honesty are exhibited as incentives to its practice. Whether from pagan or Christian writers, the language used cannot be misinterpreted. The declaration of the Latin moralist and orator is "Itaque utilitas valuit propter honestatem, sine qua ne utilitas quidem esse potuisset;" and the great expounder of the system, by which our conduct is professedly regulated, tells us most explicitly "to provide things honest in the sight of all men," and to "be in all things willing to live honestly." It would be but an insult to your moral principle, to intemperately urge upon you conformity to such golden precepts; but in discharging the task assigned me, I cannot do otherwise than regard you as subject to the infirmities that appertain to human nature; and if a deviation from the highest standard did not happen, such precepts might be regarded as superfluous. Temptation must occur to every one, and happy he who can resist it. To every mode by which a livelihood is made, the charge of deviation from the path of rectitude is applicable, and, unfortunately, with respect to pharmacy, is too well founded.

The facilities for imposition are innumerable, and in the hands of a designing and unprincipled individual may readily be turned to profit. To be guilty of the practices, over which the upright disciple of pharmacy must mourn, is, to say the least of it, an utter recklessness of character and sacrifice of honour; but to take from the sick and dying the prop on which his hope for restoration and life depends, is inexcusable—nay, a heinous crime; and I envy not the man who bears it on his conscience. No competition can warrant it; for where "poverty but not the will consents" to acts so flagrant, better abandon the profession and seek an honest living in some other; for as the sentiment is not too strongly expressed, that "an honest man is the noblest work of God," no one, whose head and heart are right, can deliberately suffer himself to be undeserving the eulogy.

Gentlemen, I have now concluded the remarks which I proposed to make at the commencement of this address, and I commit them to your serious consideration. The standard of success which has been held before you is high, but I am certain, that were it less so, it would not satisfy your wishes. What has been said in urging you to strive for its attainment, is not all that might have been appropriately said. The ethics by which pharmacy should be regulated are wide spread and minute, extending themselves into an infinitude of ramifications. To embrace the whole in a single discourse would be impossible. I submit the subject to your reflection, confident of the result; and feeling that all our labour and anxiety will not be lost upon you. May prosperity and happiness bestow their smiles upon you; and if adversity should come, may its iron grasp be mitigated by the consciousness of rectitude. Approve yourselves like men, and you cannot fail to be ornaments of the community in which your destiny is cast, and sustain the credit of the College by which you have been adopted. Farewell.

## ART. XX.—ANALYSIS OF A CONCRETION FROM A HORSE'S STOMACH.

By Charles M. Wetherill and M. H. Boyé, M. D.

(*From the Proceedings of the American Phil. Society, March*, 1846.)

This concretion, for a fuller description of which in connection with its history Dr. B. referred to his friend, Dr. B. H. Coates, by whom it was handed to him for examination. is remarkable for its size, weighing 11¾ lbs.

It is of an oval shape, smooth surface, brownish-grey colour, and breaks in concentric layers of different thicknesses, exhibiting a fibrous or radiated structure. The outer layer alone was analysed. The concretion was found by Dr. Coates to contain a nail in its centre.

By a qualitative examination it was found to consist of phosphoric acid, magnesia, ammonia, chemically combined water, a small portion of organic matter and silex. It contained no lime. In order to determine quantitatively these ingredients, a portion was dissolved in dilute chlorohydric acid—the insoluble residue collected on a counterpoised filter, dried, and weighed; after incineration and weighing, it yielded *insoluble inorganic matter* 0.45 per cent, which. deducted from its former weight, gave *insoluble organic matter* 0.64 per cent. To the filtered solution, was added a weighed portion of iron wire, dissolved in nitro-muriatic acid, and the whole then precipitated by ammonia. Having previously ascertained the amount of peroxide of iron. yielded by an equal portion of the same iron wire, the difference in weight of these two precipitates gave for the *Phosphoric acid* 32.40 *per cent.*

To the filtered solution from the phosphoric acid. was added caustic potash in excess, and the whole boiled until the ammoniacal vapours were effectually expelled, and the

solution gave a strong alkaline reaction. The magnesia thus obtained was collected upon a filter, washed with boiling water, incinerated and weighed; it yielded 14.45 per cent.

Another portion of the powdered concretion, dried over sulphuric acid in vacuo at ordinary temperature, yielded *hygrometric moisture* 1 per cent; incinerated, it yielded *volatile matter (water and ammonia)* 51.70 *per cent.*

In order to determine the amount of ammonia, another portion of the powder was introduced into a small tubulated retort with carbonate of soda and water. The neck of the retort was adapted to a small tubulated receiver, containing dilute hydrochloric acid, and having adapted to its tubulure a nitrogen bulb, such as is used in ultimate organic analysis; this also contained dilute hydrochloric acid. The mixture in the retort was then evaporated to dryness, and at the close of the operation, air was drawn through the apparatus to insure the absorption of the last portion of ammonia.

The ammonia thus obtained was estimated by precipitation by chloride of platinum as in organic analysis, and yielded 0.71 per cent.

Hence the composition of the concretion is as follows :—

| | | |
|---|---|---|
| Phosphoric acid, - - | 32.40 | per cent. |
| Magnesia, - - - - | 14.45 | " |
| Water, - - - - - | 50.35 | " |
| Ammonia, - - - - | .71 | " |
| Insol. inorganic matter, | .45 | " |
| " organic " | .64 | " |
| Hygroscopic moisture, | 1.00 | " |
| | 100.00 | |

It will be seen from this, that the amount of ammonia is too small to be considered an essential ingredient of the concretion. Assuming it to exist in the state of double phosphate of ammonia and magnesia with water ($NH_4O$,

2 Mg O, $PO_3$+2 HO+10 HO,) and deducting the amount of this salt from the rest, (omitting the insoluble matter and hygroscopic moisture), it will be seen that the concretion is composed mainly of the phosphate of magnesia and water, according to the following formula, 3 MgO+3 HO+2 $PO^5$+21 Aq. as will be seen from the following composition :

| | By Experiment. | | By Calculation. |
|---|---|---|---|
| Phosphoric acid, | 33.56 | 2 $PO_5$, . . . | 33.70 |
| Magnesia, . . | 14.55 | 3 MgO, . . . | 15.20 |
| Water, . . . | 51.89 | 24 Aq. . . . | 51.00 |
| | 100.00 | | 100.00 |

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## ART. XXI.—ON AMERICAN BROMINE.

By George W. Patrick.

*(Extract from an Inaugural Essay.)*

This interesting substance, within the last two years, has been found very abundantly in the bittern or mother liquor, remaining after the crystallization of salt from the evaporated waters of the Salt Springs, near Pittsburg, Pennsylvania; and from the facility with which it is now extracted, will undoubtedly prove a source of considerable revenue to those engaged in obtaining it.

Edward Gillespie, M. D., while a student, first discovered this substance in these waters by testing them for iodine. These waters yield about 1.13 per cent. of bromine, being nearly equal to the celebrated springs of Germany. The gentlemen now engaged in obtaining it have patented their process, which is said to be so simple and economical as to

enable them with very little labor to produce forty or fifty pounds of pure bromine per week. They have recently sent one hundred pounds of it to Europe, hoping to be able to bring it in successful competition with the German and French article, which for the last few years has commanded such a high price as to be little used in this country as a medicinal agent—being chiefly consumed in the daguerreotype process. This bromine has been pronounced by chemists here who have examined it, as purer than the European article as generally found in our markets. Its sensible properties are precisely similar to the foreign article, having the density, odour and colour belonging to this element. In one respect, however, I find a discrepancy. Bromine is stated by authors to be soluble in alcohol; but I have been unable to effect a proper solution of the American article in this menstruum, as it appears to decompose either strong or diluted alcohol, uniting with it in all proportions, and when a quantity of bromine is suddenly introduced into this liquid, the reaction is so violent as to occasion flashes of light and violent ebullition, until the bromine entirely disappears, and the liquid becomes colourless, having properties resembling ether, probably hydrobromic ether, inasmuch as the acid which it contains is generated by the contact of bromine and alcohol.

As a medicinal agent, bromine is sometimes employed in an uncombined state, mixed with syrup of sarsaparilla or other similar vehicle; but it has been more frequently exhibited in the forms of the bromides of potassium and of iron. Three processes have been employed in obtaining the former. The first by decomposing a solution of bromide of iron with carbonate of potassa, as directed by the London Pharmacopœia; the second by passing a current of hydrosulphuric acid into bromine under water, until all the free bromine has disappeared, and saturating the solution of hydrobromic acid with carbonate of potassa; and lastly, by saturating a strong solution of caustic potassa with bro-

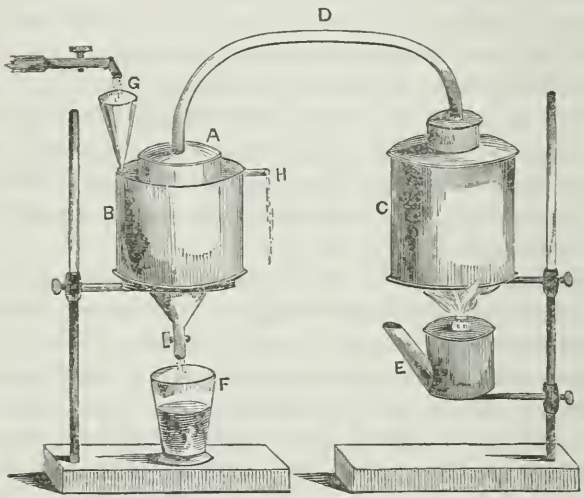
mine, evaporating to dryness, and heating the dried mass to a red heat to decompose the bromate of potassa which is mixed with the bromide. I consider this process the best, as it yields the purest salt in the most perfect crystals.

*Bromide of Iron.* This salt is obtained by adding bromine to iron filings in excess under water, and submitting them to a moderate heat. When the liquid assumes a greenish yellow appearance it is filtered and evaporated rapidly to dryness in an iron vessel. Bromide of iron is a brick red, very deliquescent salt, of an acrid styptic taste, and requires to be kept closely stopped in glass vials. This bromide has been used quite extensively in Pittsburg, Pa., as a tonic and alterative, and is considered by many physicians to be a highly efficacious preparation. This salt may be known by the liberation of bromine, by the addition of sulphuric acid.

The bittern waters, in a very concentrated state, have been employed with decided advantage in this city as a counter irritant in rheumatic and neuralgic affections. The liquid contains some of the salts of bromine with a small quantity of iodine, besides chloride of sodium and other salts, and has a specific gravity of 1.419. After a few applications a plentiful crop of pustules are produced, which pass away in a short time after ceasing its use. There is little doubt that this article will prove to be an agent of considerable importance in the above named complaints. There are several other preparatinos of bromine which have occasionally been used in medicine; they are prepared like the corresponding iodides; among these the bromide of sulphur has been used with advantage in cutaneous affections. It is formed by the direct union of its elements,—a compound of bromine and iodine, has been much used in daguerreotype operations.

## ART. XXII.—OBSERVATIONS ON A NEW DISPLACEMENT APPARATUS, INVENTED AND PATENTED BY CHARLES AUGUSTUS SMITH, OF CINCINNATI.

BY WILLIAM PROCTER, JR.




*A.* The displacement cylinder with a tin diaphragm at its base.

*B.* The refrigerator surrounding the displacer, and which is kept supplied with cold water by means of the pipe and funnel *G.*

*C.* Is the boiler or vessel containing the menstruum intended to act on the ingredients.

*D.* Is a leaden tube connecting the boiler with the top of the displacer.

*E.* Is the source of heat, which may be a large Argand burner, or it may with propriety be a small furnace, or the top of a stove.

The instrument figured above has been invented by C. Augustus Smith of Cincinnati, with a view to the extraction of the soluble matter of drugs; and he has taken steps to procure a patent, securing him the pecuniary benefit of his

invention. The propriety of this course of the inventor, in thus withholding the free use of his invention from the Pharmaceutical public, it is not for us to discuss; nor are we altogether confident that his claims to originality in the principles of his machine can be satisfactorily maintained—but so far as it is designed to improve the Pharmacy of our country, we wish its inventor success.

At the request of Charles R. Smith who brought the apparatus to this city, and who is one of the proprietors of the patent, several experimental trials have been made with it, with the design of testing its powers; and the object of this paper is to exhibit the results of these trials in a fair, unbiassed statement.

As exhibited above, the machine consists essentially of a refrigerated displacer, a boiler, and a tube connecting these, through which the vapour passes from the latter to the former. In operating with this instrument, the substance to be treated, in the state of coarse powder, is placed on the diaphragm in the displacer, and should be sufficient in quantity to fill it within a short distance of the top, or as a general rule as high as the surface of the water in the refrigerator. The boiler should contain the menstruum destined to act on the ingredients in the displacer, and should be greater in quantity than the amount of product sought after, by at least fifty per cent. The boiler and displacement cylinder are then connected by the leaden tube to which is attached the lids, and the joints secured by luting. A current of cool water is conducted to the bottom of the refrigerator, whilst the warm fluid is carried off by the pipe at the top. Heat is then applied to the boiler and as the only outlet for the vapour is through the substance in the displacer, it becomes condensed in its passage amongst the particles and gradually saturates the whole mass. As soon as this is effected the saturated fluid commences to pass into the vessel below.

The first substance operated upon was uva ursi in coarse powder, and the menstruum, water. The first few ounces of fluid which passed was almost colorless, owing to the steam nearly all condensing on the cool sides of the displacer, and passing down its surface without acting to any extent on the leaves; but soon after, the product was highly charged with color and taste, and was found to contain twenty five per cent of solid extract by evaporation. The proportion gradually decreased, until the last runnings possessed but little color or taste. When the operation was concluded, the leaves were found comparatively free from moisture, and the portion nearest the sides of the displacer entirely exhausted of astringency. The central part, however, retained to a considerable degree its peculiar taste, which will be noticed in the sequel.

The second experiment was with Jamaica ginger, and the menstruum used was alcohol. The first part of the product was highly concentrated and colored. The operation was continued till as much product had passed, as the amount of ginger required for the officinal tincture. The last runnings were yet charged with the taste and odor of ginger, but very much less so than the first. The tincture obtained, however, was fully equal to that made in the ordinary way, and four pints were made in as many hours by the heat of a gas burner;—the time occupied of course depends on the greater or less rapidity of the vaporization of the menstruum in the boiler, and of its condensation in the displacer.

The third trial was with senna, the menstruum being water. It is well known that in treating senna by displacement, it has been found necessary to use diluted alcohol, owing to the large amount of mucilage in the leaves. When, however, the water is applied in this apparatus, no difficulty is experienced, and the operation proceeded as successfully as in the other cases mentioned, the senna being merely bruised.

The inventor of the machine has stated that it can be applied in the preparation of hydro-alcoholic tinctures, in the same way that water or alcoholic preparations are made, but it must appear that in boiling diluted alcohol, the first portion that distils over will be more highly alcoholic than the last. In order to test the apparatus fairly, a substance was chosen which contained a resinous active principle, which would be precipitated from the first alcoholic liquid by the subsequent watery product, should it turn out that the alcohol vaporized first. This supposition was fully realized by experiment with Helleborus niger in coarse powder. The first product was extremely bitter, but was so strongly alcoholic that it marked 30° Baumé, notwithstanding it contained the resinous matter of the root. As the process proceeded, the liquid became less alcoholic, and cloudy, and when finished the whole product had the aspect of muddy water. By standing, a portion of flocculent matter rose to the surface, and some precipitated. This cloudiness is not objectionable in making the extract, but for the tincture it would require a new filtration.

The fifth trial was made with Krameria, with water as a menstruum, with the design of making an extract. The same concentrated solution was obtained at first as in the other cases, but although the liquid passed transparent, as soon as it cooled, a brick colored precipitate of apotheme was deposited. It follows, therefore, that, as applied to rhatany, the objections of ebullition are equally applicable to this process, except in so far, that in this case the substance is not acted on by the atmosphere during the action of the menstruum.

In exhausting substances which contain fecula by water, this method is not greatly superior to boiling, when the presence of the starch in the product is objectionable, because the temperature of the condensed menstruum is sufficient to rupture the granules of fecula, as has been tried with sarsaparilla. When, however, the object is to prepare infu-

sions or decoctions to be used as such, or to be made into extracts or fluid extracts it may be applied with advantage. Where the menstruum is homogeneous as water, or alcohol, the process works very well, but when mixed liquids like diluted alcohol are to be vaporized, the greater volatility of one than the other is a strong objection.

A process somewhat like this has been patented in Europe for extracting the coloring matter from dyewoods, which consists in saturating the wood in fine chips or shavings with steam, and when they are swelled with condensed vapour, boiling water is poured on and boiled. The apparatus under consideration will no doubt answer for the same use, with the additional advantage of giving a concentrated infusion or rather decoction.

With reference to the working of the apparatus, apart from its principle of action, it may be remarked, that as the condensing surface is applied merely to the external surface of the ingredients in contact with the sides of the displacer, it follows that that portion of the substance receives the action of the largest portion of the condensed vapour. It may easily be conceived that the central portion of the ingredients for some depth may become so hot as not to condense the vapour, and consequently to receive but little action from the condensed fluid, which is in accordance with experiment. In the case of black hellebore, above stated, while that portion of the root near the sides of the displacer was tasteless, the central portion, amounting to about one-fourth or one-fifth of the whole, was strongly bitter, notwithstanding a larger amount of menstruum had been employed than was directed for that quantity of root. The same was found to occur in the case of the ginger, although to a less extent. This difficulty might be remedied by having the substance placed between two concentric cylinders with cool water applied to each surface, which would increase the surface of condensation.

There is a decided advantage obtained by permitting the vapour to pass over and condense among the particles of

the substance for some time before the water is introduced into the refrigerator, as by this means all parts of the substance become swelled and moistened to a certain extent.

Among the advantages to be gained by this instrument, according to the inventor, is the invariable use of distilled water, which in limestone regions is of some importance. The great density of the product is also an advantage in those cases requiring evaporation. Upon the whole, with certain modifications in the condensing arrangement, I believe this instrument may become useful in many pharmaceutical processes, particularly in the preparation of extracts.

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## ART. XXIII.—AN ESSAY ON ALCOHOLIC TINCTURES.

BY M. JAQUES PERSONNE.

(Continued from page 21.)

### 4. *Nux Vomica.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. or | 15 gr. | by | 60 gr. | or | 4 pts. | alc. at 80° | total ext. of tinct. 2·69 |
| " | 75 | " | 5 | " | id. | " | 1·10 |
| " | 60 | " | 4 | " | 56 | " | 1·28 |
| " | 75 | " | 5 | " | id. | " | 1·38 |
| " | 90 | " | 6 | " | id. | " | 1·32 |
| " | 75 | " | 5 | " | 45 | " | 1·44 |
| " | 90 | " | 6 | " | id. | " | 1·38 |

*Quantity of the Alkaloid.*

In 200 grs. of tinc. made with—

| | | | | |
|---|---|---|---|---|
| 1 pt. nux vomica and | 5 pts. | alc. at 80° | precip. obtained | 1·126 |
| " | " | 56 | " | 1·382 |
| " | " | 45 | " | 1·042 |

Alcohol at 56°, being that which dissolves the greatest quantity of strychnine, should be preferred, and also the proportion of 5 pts., being that which furnishes the greatest

portion of soluble matters. The Codex prescribes alcohol at 80°.

5. *Jalap.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. 15 gr. | by | 60 gr. | or | 4 pts. | alc. at | 90° | total ext. of tinct. 3·75 |
| " | | 60 | " | 4 | " | 80 | " 4·44 |
| " | | 75 | " | 5 | " | id. | " 5·21 |
| " | | 90 | " | 6 | " | id. | " 5·26 |
| " | | 105 | " | 7 | " | id. | " 5·29 |
| " | | 60 | " | 4 | " | 70 | " 4·36 |
| " | | 60 | " | 4 | " | 56 | " 5·50 |

*Quantity of the Resin.*

| | | | | grs. |
|---|---|---|---|---|
| 100 gr. tinc. made with 1 pt. jalap & 5 pts. alc. at 90° | | | | resin obtained 4·38 |
| 100 | " | " | 80 | 4·850 |
| 100 | " | " | 70 | 3·825 |
| 100 | " | " | 56 | 2·745 |

I should employ alcohol at 80° for the preparation of this tincture, because it was proved by experiment that that degree is the most favorable for the purpose of dissolving the greatest portion of the resin, the active principle, which it is our object to obtain in this medicament. I should also adopt the proportion of five parts of this solvent, because the excess of matter dissolved by a larger quantity of the liquid is so trifling that it may be passed over.

The Codex employs alcohol at 56°, which, as we see, dissolves a much smaller proportion of the resin than the preceding.

6. *Ipecacuanha.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. 15 gr. | by | 60 gr. | or | 4 pts. | alc. at | 80° | total ext. 2.02 |
| " | | 75 | " | 5 | " | id. | " 2·12 |
| " | | 60 | " | 4 | " | 56 | " 3·02 |
| " | | 75 | " | 5 | " | id. | " 3·21 |
| " | | 90 | " | 6 | " | id. | " 3·11 |
| " | | 75 | " | 5 | " | 46 | " 1·80 |

In this case I was not able to ascertain the quantity of the alkaloïd it contained. We know, in fact, that impure emetine is precipitated from its solution by acetate of lead. But we know the great solubility of this alkaloïd in water, which makes its preparation difficult; on this account they have chosen in the Codex alcohol at 56°, for the preparation of this tincture.

This strength of alcohol being that which dissolves the greatest quantity of the matter, as we see in the above table, I should give it the preference, as well as the proportion of 5 parts of this solvent which takes up an excess of matter equal to 0·19.

7. *Rhubarb.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. 15 gr. | by 60 gr. | or 4 pts. | alc. at | 80° | total ext. of tinct | | 6·00 |
| " 75 | " 5 | " | id. | | " | | 6·34 |
| " 60 | " 4 | " | 56 | | " | | 6·44 |
| " 75 | " 5 | " | id. | | " | | 6·89 |
| " 90 | " 6 | " | id. | | " | | 6·81 |
| " 75 | " 5 | " | 45 | | " | | 6·80 |
| " 90 | " 6 | " | id. | | " | | 6·74 |

The two last were extremely mucilaginous.

I endeavored to discover in which of these tinctures the bitterness would remain, after the addition of water. 10 grammes of each of these tinctures, prepared with one part rhubarb and five of alcohol at 56° and 80°, were diluted with the same quantity of water (400 gr.): the tincture with the alcohol at 80°, was cloudy, and still rather bitter; that prepared with alcohol at 56° remained transparent, and had no longer a bitter taste; from which we may conclude that alcohol at 80° dissolves more of the active principle.

But, as we know that this tincture is often administered in an undiluted state, in that case alcohol at 80° would be far too strong a spirit. I think, therefore, that it would be better, on this account, as in the Codex, to adopt alcohol at 56° only. I should choose the proportion of five parts of

the solvent, which is that which takes up the greatest quantity of extractive matter from this substance.

8. *Wormwood.*

| | | | | | | grs. |
|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by 60 gr. | or 4 pts. | alc. at | 80° total ext. | 2·20 |
| " | 75 " | 5 " | id. | " | 2·67 |
| " | 60 " | 4 " | 56 | " | 2·91 |
| " | 75 " | 5 " | id. | " | 3·58 |
| " | 96 " | 6 " | id. | " | 3·11 |
| " | 75 " | 5 " | 45 | " | 3·53 |
| " | 90 " | 6 " | id. | " | 3·50 |

20 grammes of the tincture, prepared with one part of wormwood, and five parts of each of the different degrees of alcohol mentioned above, were diluted with the same quantity of water (400 grammes); the bitter taste of all these tinctures, although much reduced, could still be perceived, but I could not establish the difference in the degree of bitterness presented by each. This fact I had proved by others, not wishing to trust to myself alone.

As all these tinctures possessed the same properties, since it is the bitter principle we are in search of in this medicament, and, as in the preceding case, this tincture is also administered in an undiluted state, I saw no necessity for changing the strength of the alcohol prescribed by the Codex.

I therefore employed alcohol at 56°, in the proportion of five parts, which, as we see in the table, furnishes the greatest quantity of extract.

9. *Gentian.*

| | | | | | | grs. |
|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by 60 gr. | or 4 pts. | alc. at | 80° total ext. | 4·75 |
| " | 75 " | 5 " | id. | " | 4·89 |
| " | 75 " | 5 " | 70 | " | 5·34 |
| " | 90 " | 6 " | id. | " | 5·29 |
| " | 60 " | 4 " | 56 | " | 5.24 |
| " | 75 " | 5 " | id. | " | 5·22 |
| " | 75 " | 5 " | 45 | " | 4·95 |

This substance was tested like the preceding. The tinctures subjected to the proof were also prepared with one part of the substance, and five parts of alcohol of different degrees of strength, and as we were unable to decide upon the difference in the degree of bitterness, exhibited by each of these tinctures, after having been diluted with the same quantity of water, I see no necessity for changing the degree of strength adopted in the Codex, especially as this tincture, like the two preceding, is often administered alone. I should, therefore, recommend alcohol at 56°.

Here again, as we see, is an exception to the general rule, which is, that four parts give more extract than five parts, but, I repeat, that as there is certainly an advantage in employing the same proportions in the greatest possible number of cases, I should adopt the proportion of 5 parts of alcohol.

10. *Foxglove.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. | alc. at 80° total ext. | 3·65 |
| " | 75 " | " | 5 | " | id. | " | 4·11 |
| " | 60 " | " | 4 | " | 56 | " | 5·47 |
| " | 75 " | " | 5 | " | id. | " | 5·66 |
| " | 90 " | " | 6 | " | id. | " | 5·80 |
| " | 75 " | " | 5 | " | 45 | " | 5·02 |

Instead of alcohol at 80°, as directed by the Codex, I should, in this case, adopt alcohol at 56°, because, as we perfectly well know, especially since the work of M. Homolle, the active principle of digitalis is very readily dissolved by water. For a long time, also, no one has been ignorant of the caution with which tincture of digitalis ought to be administered, on account of its powerful effects. I here also give the preference to the proportion of five parts of the solvent, neglecting the small excess of matter dissolved by six parts.

11. *Belladonna.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. 15 gr. | by | 60 gr. | or | 4 pts. | alc. at 80° | total ext. | 1·90 |
| " | | 60 " | | 4 " | 56 | " | 2·35 |
| " | | 75 " | | 5 " | id. | " | 2·46 |
| " | | 90 " | | 6 " | id. | " | 2·49 |
| " | | 75 " | | 5 " | 45 | " | 2·50 |
| " | | 90 " | | 6 " | id. | " | 2·44 |

We see, in this case, that alcohol at 80° dissolves less matter than alcohol at 56°, and that five parts of the latter dissolve rather more than four. Which of these solvents has dissolved the greatest quantity of the active principle? Atropine is extremely soluble in concentrated alcohol; but we also know that this active principle also exists in the plant in a state of combination, perfectly soluble in water; on this account, alcohol, at 56°, has been admitted by the Codex in the preparation of this tincture. Besides, the tincture prepared with alcohol at 80° is green, and consequently, loaded with chlorophylle, an inert substance; while the other tinctures contain an imperceptible quantity of this principle. We also see that there is no sensible difference between the quantity of extract obtained by means of alcohol at 56° and alcohol at 45°.

12. *Stramonium.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. 15 gr. | by | 60 gr. | or | 4 pt. | alc. at 80° | total ext. | 2·36 |
| " | | 60 " | | 4 " | 56 | " | 3·05 |
| " | | 75 " | | 5 " | id. | " | 3·15 |
| " | | 90 " | | 6 " | id. | " | 3·14 |
| " | | 75 " | | 5 " | 45 | " | 3·95 |
| " | | 90 " | | 6 " | id. | " | 4·10 |

The active principle of this substance, as well as that of belladonna, on the same account, is extremely soluble in water, the Codex, therefore, directs the use of alcohol at 56° in the preparation of this tincture. But these experiments prove that the difference between the quantity of matter

dissolved by alcohol at 56°, and alcohol at 45°, being 0·81, is sufficient in amount not to be neglected, and that the preference ought to be given to the latter solvent.

The excess of extract furnished by six parts of the solvent is so trifling that it may be neglected, and the proportion of five parts can be adopted.

13. *Henbane.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or 4 pts. | alc. at 80° | total ext. | 1·53 |
| " | 60 | " | 4 | " | 56 | " | 3·09 |
| " | 75 | " | 5 | " | id. | " | 3·24 |
| " | 80 | " | 6 | " | id. | " | 3 29 |
| " | 75 | " | 5 | " | 48 | " | 4·37 |
| " | 90 | " | 6 | " | id. | " | 4·24 |

The Codex has adopted, for the same reason as in the two preceding cases, alcohol at 56° in the preparation of this tincture ; here, also, the excess of matter dissolved by alcohol at 45° is too great to be neglected, since it amounts to 1·08. I, therefore, should employ for these three substances alcohol at 45°, and the proportion of 5 parts of the solvent.

14. *Hemlock.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or 4 pts. | alc. at 80° | total ext. | 2·95 |
| " | 60 | " | 4 | " | 56 | " | 4·20 |
| " | 75 | " | 5 | " | id. | " | 4·19 |
| " | 90 | " | 6 | " | id. | " | 4·23 |
| " | 75 | " | 5 | " | 45 | " | 4·92 |
| " | 90 | " | 6 | " | id. | " | 4·86 |

The Codex, on account of the great solubility in water of the salts of conicine, has adopted alcohol at 56° for this tincture. We perceive in fact a great difference between the quantity of soluble matter taken up by alcohol at 80°, and alcohol at 56° ; we also see that there is a difference of 0·69 between the quantity dissolved by the latter, and alcohol at 45°. This excess of soluble matter is perhaps at-

tributable to inert gummy or mucilaginous matters, but, on the other hand, the tincture, with alcohol at 56° is green, and consequently contains chlorophylle, also an inert substance. As in these cases there is a compensation on both sides, I give the preference to the alcohol that furnishes the greatest quantity of soluble matters, and consequently I should adopt alcohol at 45° in the proportion of five parts.

15. *Monkshood.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. | alc. at 80° total ext. | 1·98 |
| " | 60 " | " | 4 | " | 56 | " | 2·96 |
| " | 75 " | " | 5 | " | id. | " | 2·95 |
| " | 75 " | " | 5 | " | 45 | " | 3·60 |
| " | 90 " | " | 6 | " | id. | " | 3·65 |

The second and third of these extracts were rather green, the four and fifth were not so.

The Codex directs alcohol at 56° for this tincture, because aconitine existing in the plant, under the form of a salt, like the other alkaloïds, it is consequently easily dissolved in water. On this account I prefer alcohol at 45°, because the excess of matter taken up by the alcohol being 0·65, is large enough not to be neglected. I should also adopt the proportion of five parts of this solvent, being that which furnishes the greatest quantity of extract.

16. *Senna.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 75 gr. | or | 5 pts. | alc. at 80° total ext. | 2·54 |
| " | 60 " | " | 4 | " | 56 | " | 3·62 |
| " | 75 " | " | 5 | " | id. | " | 3·70 |
| " | 90 " | " | 6 | " | id. | " | 3·69 |
| " | 75 " | " | 5 | " | 45 | " | 3·96 |
| " | 90 " | " | 6 | " | id. | " | 4·08 |

The last two were very mucilaginous.

Agreeing with the Codex, I should give the preference to alcohol at 56°, because it is well known that the active principle of senna (cathartine) is easily dissolved in alcohol

and water. I do not adopt alcohol at 45° although it yields a larger quantity of extract, because the tincture obtained with alcohol of this strength is so extremely viscous, that it is filtered with difficulty, and the excess of product obtained is certainly only due to the mucilaginous matters, which are inert, and uselessly increase the mass; the tincture prepared with alcohol at 56° is equally full flavored, and much less mucilaginous. I should also prefer the proportion of five parts of this solvent, although the quantity of matter dissolved is very small.

17. *Leaves of the Asarum.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. | alc. at 80° total ext. | 1·96 |
| " | 60 " | " | 4 | " | 56 | " | 2·28 |
| " | 75 " | " | 5 | " | id. | " | 2·99 |
| " | 90 " | " | 6 | " | id. | " | 3·27 |
| " | 75 " | " | 5 | " | 45 | " | 3·87 |
| " | 90 " | " | 6 | " | id. | " | 3·69 |

This substance, as we know, owes its active properties to a principle which is soluble in water, (citisine or cathartine,) and perhaps, also, to a small quantity of fat oil, and essential oil. The citisine, being extremely soluble in water, we may readily perceive that weak alcohol will have the double advantage of dissolving this substance, and at the same time the greatest portion of the fatty matters which are probably not devoid of action.

I should, therefore adopt alcohol at 45°, as well as the proportion of five for the solvent, which as we see by the table, is that which takes up the greatest portion of the soluble matter.

18. *Bulbs of the Meadow Saffron.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. | alc. at 56° total ext. | 2·56 |
| " | 75 " | " | 5 | " | id. | " | 2·89 |
| " | 90 " | " | 6 | " | id. | " | 3·29 |
| " | 75 " | " | 5 | " | 80 | " | 1·79 |
| " | 75 " | " | 5 | " | 45 | " | 3·35 |
| " | 90 " | " | 6 | " | id. | " | 3·30 |

The Codex directs alcohol at 56°, for the preparation of this tincture, properly calculating on the fact, that gallate of veratrine, to which this bulb is indebted for its properties, is extremely soluble in water. We also know that wine, a vehicle containing very little alcohol, and vinegar, readily dissolve the active portion of this substance. I, therefore, give the preference to alcohol at 45°, a liquid containing twice as much alcohol as wine; for as we see by the table, five parts of this vehicle dissolve more of the extractive matters, than five parts of alcohol at 56°, the proportion to be employed would also be five parts.

19. *White Hellebore.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or 4 pts. | alc. at 80° | total ext. | 3·82 |
| " | 60 " | " | 4 | " | 56 | " | 4·62 |
| " | 75 " | " | 5 | " | id. | " | 4·87 |
| " | 90 " | " | 6 | " | id. | " | 4·81 |
| " | 75 " | " | 5 | " | 45 | " | 5·15 |
| " | 90 " | " | 6 | " | id. | " | 5·27 |

For the same reason as in the case of the bulbs of meadow saffron, I give the preference to alcohol at 45°, and in the proportion of five parts, rejecting to maintain the general rule, on account of the small excess taken up by an additional part of the same solvent; the Codex prescribes alcohol at 56°.

20. *Valerian Root.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or 4 pts. | alc. at 56° | total ext. | 2·56 |
| " | 75 " | " | 5 | " | id. | " | 2·89 |
| " | 90 " | " | 6 | " | id. | " | 3·03 |
| " | 75 " | " | 5 | " | 70 | " | 2·77 |
| " | 75 " | " | 5 | " | 80 | " | 2·32 |
| " | 75 " | " | 5 | " | 45 | " | 3·46 |
| " | 90 " | " | 6 | " | id. | " | 3·50 |

Considering that water, and consequently weak alcohol, completely dissolves the valerianic acid, the active principle

of the valerian root, I preferred alcohol at 45°, which dissolves the greatest quantity of extractive matter. I also adopt the proportion of five parts of this solvent, for six parts take up no more extract. The Codex directs alcohol at 56°.

### 21. *Squills.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. alc. at 80° | total ext. | 3·89 |
| " | 75 " | " | 5 | " | id. | " | 7·09 |
| " | 75 " | " | 5 | " | 70 | " | 9·37 |
| " | 60 " | " | 4 | " | 56 | " | 10·21 |
| " | 75 " | " | 5 | " | id. | " | 10·92 |
| " | 90 " | " | 6 | " | id. | " | 9·66 |
| " | 75 " | " | 5 | " | 45 | " | 10·17 |

The Codex prescribes alcohol at 56° for this substance; I have not changed the strength of the alcohol, because experiment has proved to me that it is that which best dissolves the soluble parts of the squill, I only adopt the proportion of five parts, which, as we see, produces the greatest quantity of extract.

### 22. *Black Hellebore.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. alco. at 80° | total ext. | 3·22 |
| " | 75 " | " | 5 | " | id. | " | 3·20 |
| " | 75 " | " | 5 | " | 56 | " | 4·34 |
| " | 90 " | " | 6 | " | id. | " | 4·37 |
| " | 75 " | " | 5 | " | 45 | " | 2·92 |

We generally attribute the medical properties of this root to a compound consisting of a volatile acid and a fat substance; on which account alcohol at 80° has been employed for the preparation of this tincture. But if we consider that, according to my experiments, alcohol at 45°, which is the most capable of dissolving the gummy and extractive matters, nevertheless takes up much less of the soluble parts

of this root than alcohol at 56°, the conclusion will be, in my opinion, that the last ought to be preferred, for it dissolves a larger quantity than alcohol at 80°. I should even say that alcohol at 56°, as it more readily dissolves the extractive matters, ought to render the solution of the fat substances more easy, because by the disintegration of the extractive matters, it will find itself in close contact with the first. Probably, also, these extractive matters once dissolved, may assist in the solution of the others. Do we not every day see this effect produced, when we treat with water substances containing a mixture of these different substances? The water extract of guaiacum, for example, contains resin, which certainly has been removed by the extractive principle.

I, therefore, give the preference to alcohol at 56° and the proportion of five parts, for it is evident we may neglect the small excess of matter dissolved by one more part of this solvent.

### 23. *Roots of Asarum.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. | alc. at 80° total ext. | 1·90 |
| " | 75 " | " | 5 | " | id. | " | 1·00 |
| " | 60 " | " | 4 | " | 56 | " | 3·34 |
| " | 75 " | " | 5 | " | id. | " | 3·29 |
| " | 90 " | " | 6 | " | id. | " | 3·30 |
| " | 75 " | " | 5 | " | 45 | " | 3·09 |

I should adopt alcohol at 56° for this tincture, because at that strength it takes up more of the soluble matters, and the root contains rather more of the fatty principle than the leaves. I also recommend the proportion of five parts of this vehicle, although only four parts would be sufficient, as we see by the table. What makes me prefer this proportion, is the fact that this tincture is but little employed, and more particularly to avoid the inconvenience of multiplying these different proportions of alcohol.

24. *Contrayerva.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. | alc. at 80° total ext. | 1·15 |
| " | 75 | " | 5 | " | id. | " | 1·31 |
| " | 75 | " | 5 | " | 56 | " | 2·29 |
| " | 90 | " | 6 | " | id. | " | 2·22 |
| " | 75 | " | 5 | " | 45 | " | 1·57 |

No analysis having as yet shown the nature of the active principle of this substance, I choose that degree of strength which furnishes the greatest portion of soluble matter, and consequently I select alcohol at 56°, and the proportion of five parts, which is that which dissolves most of the substance.

25. *Milk Wort.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. | alc. at 80° total ext. | 4·88 |
| " | 75 | " | 5 | " | id. | " | 5·06 |
| " | 75 | " | 5 | " | 56 | " | 6·27 |
| " | 90 | " | 6 | " | id. | " | 6·36 |
| " | 75 | " | 5 | " | 45 | " | 6·09 |

Water, as we know, readily dissolves the active principle of polygala, polygalic acid, I should, therefore, give the preference to alcohol at 56°, which furnishes the greatest quantity of extract, and is certainly preferable to alcohol at 80° for the extraction of this principle, because the pectic acid, gum, and albumen contained in this root, are certainly coagulated by this last vehicle, and thus prevented coming in contact with the active matter; and as we may also reject the trifling excess of matter dissolved by six parts of alcohol, I choose the proportion of five parts of this solvent.

26. *Pellitory of Spain.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. | alc. at 80° total ext. | 1·24 |
| " | 75 | " | 5 | " | id. | " | 1·82 |
| " | 90 | " | 6 | " | id. | " | 1·64 |
| " | 75 | " | 5 | " | 90 | " | 1·20 |
| " | 60 | " | 4 | " | 56 | " | 2·13 |
| " | 75 | " | 5 | " | id. | " | 2·20 |
| " | 75 | " | 5 | " | 45 | " | 2·18 |

The first four of these extracts are extremely resinous, the three last only so in a trifling degree.

As the active principle of this substance is solely due to a resinous matter, insoluble in water, I have not changed the strength of the alcohol recommended in the Codex. In fact, I am convinced that in dissolving the extracts obtained, those prepared by strong alcohol were extremely resinous, while, on the contrary, those prepared by weak alcohol were much less so. I, therefore, recommend alcohol at 80°, giving a preference to the proportion of five parts of this solvent, being that which takes up the greatest quantities of the soluble parts of the root.

27. *Ginger.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. | alco. at 80° total ext. | 0·54 |
| " | 60 | " | 4 | " | 56 | " | 1·52 |
| " | 75 | " | 5 | " | id. | " | 1·75 |
| " | 75 | " | 5 | " | 45 | " | 2·01 |
| " | 90 | " | 6 | " | id. | " | 1·80 |

This root owes its effects to a soft resin: on that account the Codex has directed the use of alcohol at 80° for this tincture. But if, on the one hand, we consider the enormous difference between the quantity of matter dissolved by alcohol of that strength, and alcohol at 56°, and, on the other hand, that this resinous matter may be perfectly removed by means of the extractive matter, alcohol at 56°, and 5 pts. of this solvent will be employed according to my plan, and this is the proportion also that takes up the greatest quantity of the soluble matter.

28. *Cinnamon.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. | alco. at 80° total ext. | 2.61 |
| " | 75 | " | 5 | " | id. | " | 2·69 |
| " | 90 | " | 6 | " | id. | " | 2·73 |
| " | 60 | " | 4 | " | 56 | " | 2·73 |
| " | 75 | " | 5 | " | id. | " | 2·80 |
| " | 60 | " | 4 | " | 45 | " | 2·70 |
| " | 75 | " | 5 | " | id. | " | 2·72 |

The two last tinctures are so mucilaginous, they can scarcely be filtered.

As we see by this table, there is no great difference between the quantities of matter dissolved by alcohol of these different degrees of strength, but, considering that the weaker the alcohol is, the more mucilaginous the tinctures are, and that the active principle of this bark resides in its essential oil, I give the preference, as in the Codex, to alcohol at 80°; and rejecting the trifling excess of matter dissolved by six parts of this solvent, I should adopt the proportion of five parts.

### 29. *Saffron.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. | alco. at 80° total ext. | 8·10 |
| " | 60 | " | 4 | " | 70 | " | 8·69 |
| " | 60 | " | 4 | " | 56 | " | 9·06 |
| " | 75 | " | 5 | " | id. | " | 10·86 |
| " | 90 | " | 6 | " | id. | " | 10·80 |
| " | 60 | " | 4 | " | 45 | " | 8·89 |
| " | 75 | " | 5 | " | 80 | " | 8·71 |

The last two tinctures are very mucilaginous. We see according to these experiments, that weak alcohol at 55° extracts more from the saffron than alcohol at 80°; but, as it has been observed that a tincture prepared with weak alcohol, deposits, after a certain time, a considerable quantity of coloring matter, and that it can, therefore, be no longer identical in composition, while that prepared with alcohol at 80°, is much more stable, I retain, according to the Codex, alcohol at 80, for the preparation of this tincture, only I should employ five parts of this solvent, which is the proportion that produces the greatest quantity of extract from the same weight of the substance.

30. *Castoreum.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. | alco. at 90° total ext. | 6·00 |
| " | 75 | " | 5 | " | id. | " | 6·30 |
| " | 60 | " | 4 | " | 80 | " | 6.60 |
| " | 75 | " | 5 | " | id. | " | 6.50 |
| " | 75 | " | 5 | " | 70 | " | 6.05 |
| " | 60 | " | 4 | " | 56 | " | 6·00 |
| " | 75 | " | 5 | " | id. | " | 5.95 |

It is very probable that castoreum owes its properties to a compound consisting of volatile oil, castorine, and a small quantity of resin; this caused the adoption, in the Codex, of alcohol at 80° in the preparation of this tincture (my experiments confirm me in the use of this alcohol). We see, in fact, by the table, that alcohol at 80° the most perfectly extracts this substance. I also observed, by evaporating these various tinctures, that those prepared with alcohol at 90° and 80°, remained homogeneous during the evaporation, while those prepared with 70° and 56°, immediately separated into two portions; one layer being watery and transparent, in the midst of which a resinoid mass floated. Hence I conclude, that these two alcohols had dissolved a smaller quantity of the active principles, and a much greater quantity of the albuminous substances. I, therefore, adhere to the degree employed in the Codex, and although 4 parts of this solvent would be sufficient completely to exhaust this substance, I return, nevertheless, to the general rule, adopting the proportion of 5 parts of alcohol, for the number of similar cases are too few to require exception.

31. *Cantharides.*

| | | | | | | | grs. |
|---|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or | 4 pts. | alco. at 56° total ext. | 2·22 |
| " | 75 | " | 5 | " | id. | | 2·67 |
| " | 90 | " | 6 | " | id. | | 3·03 |
| " | 75 | " | 5 | " | 80 | | 1·12 |
| " | 75 | " | 5 | " | 45 | | 3·25 |
| " | 90 | " | 6 | " | id. | | 3·18 |

The last two tinctures were very mucilaginous.

My only object in making experiments on this substance was to ascertain what quantity of alcohol was most proper to remove the greatest amount of soluble matter, and consequently, to describe a new proportion of this vehicle: it would be dangerous, perhaps, to alter the proportion adopted by the Codex, on account of the great power of the medicine. I only wished to ascertain what strength of alcohol was the best. We see, according to the results exhibited in this table, that preference ought to be given to alcohol at 56°, which justifies the employment of this vehicle, according to the Codex.

32. *Myrrh.*

| | | | | | | grs. |
|---|---|---|---|---|---|---|
| 1 pt. | 15 gr. | by | 60 gr. | or 4 pts. | alco. at 90° | total ext. 4·12 |
| " | 75 | " | 5 | " | id. | 3·57 |
| " | 90 | " | 5 | " | id. | 3·06 |
| " | 60 | " | 6 | " | 80 | 4·18 |
| " | 75 | " | 5 | " | id. | 4·38 |
| " | 90 | " | 6 | " | id. | 4·50 |
| " | 60 | " | 4 | " | 70 | 4.23 |
| " | 75 | " | 5 | " | id. | 4·18 |
| " | 90 | " | 6 | " | id. | 4.26 |
| " | 60 | " | 4 | " | 56 | 2 32 |
| " | 75 | " | 5 | " | id. | 3·25 |

The results of these experiments are sufficient without commentary, to prove that the most favorable strength of the alcohol is 80°, and the proportion of the solvent five parts, for the excess taken up by a larger quantity of alcohol, is very trifling. The Codex directs the use of alcohol of the same strength.

Thus we see the number of substances, on which I have experimented, amount to 32, and the number of experiments are sufficiently considerable to enable me to draw the following conclusions from their results:—

CONCLUSIONS.

1. The degrees of strength of the alcohol prescribed by the Codex, are not always the most favorable for the solution of the largest quantity of the principles contained in the substances employed in the preparation of tinctures.

2. These degrees of strength can scarcely be admitted in a general manner, and by analogy, excepting in the case of a certain number of substances. Experiment alone can determine which is the best in each case.

3. The proportion of four parts of alcohol, for one of the substance employed in the Codex, is scarcely, in any case, sufficient to dissolve, entirely, the soluble parts of these bodies. The cases in which this proportion is sufficient are so rare as to prevent any generalisation.

4. The quantity of alcohol necessary entirely to exhaust a substance, is, in general, five parts of alcohol for one of the substance. In certain cases, however, but extremely rarely, this proportion is not quite strong enough, but the excess of matter dissolved is so trifling, that it may be left out of the question in laying down a general rule.

5. The quantity of alcohol is always sufficient to exhaust a substance, when that solvent is in sufficient quantity to cover it, and when the substance is herbaceous, as in the case of leaves.

6. The degrees of strength of the alcohol, which I have found most adapted for the preparation of different tinctures are 80°, 56°, 45°.

We shall find these different degrees of strength arranged in the following table, along with the substances for which they are adapted. I have also added, in the case of each of these tinctures, the quantity of substance equivalent to 1 gramme of the tincture.

Before I conclude I must mention a singular fact, which, as we may perceive, presented itself in almost every experiment : in almost every instance when the proportion of

alcohol was too great, I always obtained less extract than when it was just enough ; that is to say, the more I increased the quantity of the alcohol, the more the quantity of extract was decreased.

This fact, analagous to that which I have often observed when water is added to a concentrated solution of opium when we see substances precipitated that were previously held in solution; this fact, I say, sufficiently proves, that there is a great inconvenience in too much increasing the proportion of alcohol in the preparation of tinctures ; for, besides that, the density of the tincture would be diminished by this addition of alcohol, it would be still more so, by the precipitation of a certain quantity of matter, as occurs in the case of the solution of opium.

*A Table of the different strength of Alcohol to be employed in the preparation of each substance.*

We prepare, with one part of the substance and 5 parts of alcohol at 80°, the tinctures of—

| | | | | |
|---|---|---|---|---|
| Yellow bark | 1 gr. of tincture, | equal to | 0·20 | in powder. |
| Jalap, | 1 gr. | " | 0·19 | |
| Cinnamon, | 1 gr. | " | 0·20 | " |
| Pellitory of Spain, | 1 gr. | " | 0·20 | " |
| Saffron, | 1 gr. | " | 0·17 | " |
| Castoreum, | 1 gr. | " | 0·18 | " |
| Myrrh, | 1 gr. | " | 0·19 | " |

1 part of the substance and 5 parts of alcohol at 56° for the following tinctures :—

| | | | | |
|---|---|---|---|---|
| Rhubarb, | 1 gr. of tincture, | equal to | 0·18 | in powder. |
| Wormwood, | 1 gr. | " | 0·19 | " |
| Gray bark, | 1 gr. | " | 0·20 | " |
| Ipecacuanha, | 1 gr. | " | 0·19 | " |
| Nux vomica, | 1 gr. | " | 0·20 | " |
| Gentian, | 1 gr. | " | 0·18 | " |
| Red Bark, | 1 gr. | " | 0·20 | " |
| Foxglove, | 1 gr. | " | 0·18 | " |

| | | | | |
|---|---|---|---|---|
| Senna, | 1 gr. | of tincture equal to | 0·19 | in powder. |
| Squills, | 1 gr. | " | 0·17 | " |
| Blk. hellebore, | 1 gr. | " | 0·18 | " |
| Root of asarum | 1 gr. | " | 0·19 | " |
| Contrayerva, | 1 gr. | " | 0 20 | " |
| Milkwort, | 1 gr. | " | 0·18 | " |
| Ginger, | 1 gr. | " | 0 20 | " |

According to the Codex, 8 parts of alcohol at 56° are required for tincture of cantharides.

We prepare, with 1 part of the substance, and 5 parts of alcohol at 45°, the following tinctures :

| | | | | |
|---|---|---|---|---|
| Valerian root, | 1 gr. | of tinct. equal to | 0·19 | in powder. |
| White hellebore, | 1 gr. | " | 0·18 | " |
| Bulbs of meadow saffron, | 1 gr. | " | 0·19 | " |
| Leaves of asarum, | 1 gr. | " | 0·19 | " |
| Wolf'sbane, | 1 gr. | " | 0·19 | " |
| Hemlock, | 1 gr. | " | 0·18 | " |
| Belladonna, | 1 gr. | " | 0·19 | " |
| Henbane, | 1 gr. | " | 0·18 | " |
| Stramonium, | 1 gr. | " | 0·18 | " |

As to the mode of preparing these tinctures, I think experience has sufficiently proved that of all the plans proposed, cold maceration is the best. *Chem'st.*

* The author, in offering the opinion that cold maceration is the best, does it with reference to obtaining a saturated solution of the soluble matter of the drugs, without reference to economy, and by repudiating the employment of displacement as a means of obtaining the full amount of the saturated liquid after maceration, in many instances a loss of 30 per cent. will be the consequence, owing to the bulk of the ingredients. Expression is but an imperfect means of extracting the saturated fluid in numerous cases. It may be well to observe that the proportion of menstruum recommended by M. Personne, is less in most cases than that of our Pharmacopœia, and hence but few of the officinal tinctures are saturated solutions.—*Ed. Am. Journ. Pharm.*

## ART. XXIV.—FURTHER NOTICE RESPECTING SIBERIAN AND BUCHARIAN RHUBARBS, WITH SOME REMARKS ON TASCHKENT RHUBARB.

By Jonathan Pereira, M. D., F. R. S.

In the paper published in the last number of the *Pharmaceutical Journal* on some rare kinds of rhubarb which have recently appeared in British commerce, I noticed four varieties of rhubarb. I have subsequently received from Mr. Faber some additional information respecting two of these, viz., the Siberian and Bucharian sorts, which I beg to communicate to the Society.

I may observe that the following information has just been received from one of the first drug-houses in St. Petersburg, namely, Messrs. Dyrssen & Co., than whom, Mr. Faber assures me, no person can be expected to give information upon which more reliance can be placed. The letter is dated March 18th.

1. *Siberian Rhubarb.*

In my former paper, I stated that the rhubarb which I called Siberian, had been sent to this country as Bucharian. But three circumstances led me to conclude that it was Siberian. First, it differed from Bucharian rhubarb which arrived here in 1840. Secondly, it was suggested by one of Mr. Faber's correspondents that it was not Bucharian but Siberian; and thirdly, it agreed with the Siberian rhapontic root described by Grassman.

My conclusions, it appears, are correct, and the drug firm above alluded to, in their letter to Mr. Faber, just received, observe, "from your minute description of the three chests of rhubarb, we are quite sure that it is and can be no other than our *Siberian radix rhapontica.* It is a distinct species, and is not the root branches of either Bucharian or crown rhubarb."

3. *Bucharian Rhubarb.*

The same firm, in the letter just referred to, observe, with respect to Bucharian rhubarb, that, "the true Bucharian rhubarb, of which we sent you samples in 1840, does not come to us by Brody, as you suggest, but by Nischny (or Nishnij), to which place it is brought in a crude state, and where it is trimmed for the Moscow market." Mr. Faber, however, assures me that he is confident that both true Bucharian, and also Siberian rhubarb under the name of Bucharian, have been brought by Brody; because one of his Vienna friends describes exactly the former, and the other exactly the latter; and both are to be depended on, and understand their business extremely well.

3. *Taschkent Rhubarb.*

By way of explanation respecting this rhubarb, it may be premised, that the rhubarb which is imported into England from St. Petersburg, and which is here commonly known as *Russian Rhubarb*, is called in Russia *Chinese Rhubarb;* while our Canton rhubarb is unknown in Russia; for it is the policy of the Russians not to admit China products by sea, as they have no sea communication with China; and consequently, rhubarb, tea, and other articles are not admitted from England.

In the letter from St. Petersburg to Mr. Faber, from which I have before made some extracts, the following observation occurs:—"The refuse of the true Russian rhubarb (here called Chinese rhubarb) comes to us by way of Taschkent, and differs very little from the crown rhubarb. It is called here *Taschkent rhubarb.*"

From this observation it is obvious that the suggestion contained in my former paper, as to the origin of Bucharian rhubarb, is not correct. Bucharian rhubarb is therefore a distinct sort, and is not the refuse of the crown rhubarb as I had supposed.

I am informed that in Russia the Bucharian and Taschkent rhubarbs are used for purposes for which the crown rhubarb is too expensive.

*Chemistry of Rhubarb.*—Grassman, to whose paper I have already several times referred, sent to Buchner, from St. Petersburg, four sorts of rhubarb, which were chemically examined by Dr. J. E. Herberger, some of whose results I here subjoin. I may premise, however, that the rhubarb which he calls *Chinese*, is doubtless the sort known in England as Russian. The *white rhubarb* is the kind to which I have referred in my *Elements of Materia Medica*, vol ii. p. 1179, 2d edition.

Dr. Herberger subjected the rhubarbs to the successive action of ether, alcohol, and water, so that the residue which was unacted on by ether, was subjected to the action of alcohol, and the residue from which alcohol extracted nothing more, was then submitted to the action of water.

The residue which was thus undissolved by ether, alcohol, and water, was then incinerated. The lime contained in the obtained ashes was afterwards converted into oxalate of lime by means of neutral oxalate of potash. In this way was obtained the amount of oxalate of lime mentioned in the subjoined table :

| | Decigrammes [2=3.0368 grs. Troy] of the following Rhubarbs. | | | |
|---|---|---|---|---|
| | Bucharian. | Chinese. [Russian.] | White. | Siberian. Rhapontic |
| | Grammes. | Grammes. | Grammes | Grammes. |
| Dry Ethereal Extract . . | 0·0005 | 0·0005 | 0·0005 | 0·0010 |
| " Alcoholic do . . . | 0·0030 | 0·0020 | 0·0020 | 0·0030 |
| " Aqueous do . . . | 0·0095 | 0·0100 | 0·0110 | 0·0120 |
| Oxalate Lime . . . . | 0·0035 | 0·0040 | 0·0043 | 0·0015 |
| | 0·0165 | 0·0170 | 0·0178 | 0·0175 |
| Other constituents of the Ashes—Woody Fibre. | 0·0035 | 0 0030 | 0.0022 | 0·0025 |
| | 0·2000 | 0·2000 | 0·2000 | 0·2000 |

The white rhubarb, it will be perceived, contains more oxalate of lime than the other sorts. This constituent, with the starch, is the cause of the whiteness of this sort of rhubarb.

It is obvious, however, that no reliance can be placed on the results, on account of the minute quantities of the substances operated on.—*Pharm. Journ.*

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## ART. XXV.—ON THE STATE OF PHARMACY IN POLAND.

By Franz Sokolowsky.

Although the Poles are groaning under a load of oppression, and their literature is confined to their own country, their public institutions, in general, are excellent, worthy of imitation, and in accordance with the state of civilization in Europe in general, as may be proved by inspection of the Medical regulations relating to Pharmacy in Poland.

In the year 1839, a General Direction of Medical Affairs with two sub-divisions, was instituted in Warsaw, by an order of the Emperor and King. The one division, the Medical Council, is engaged in scientific subjects, Institutions of Education, Examinations, &c.; the other relates to medical police. Under this central direction are four medical inspectoria; so that for every two governments an inspectorium exists, constituted of three Physicians, one Assessor of Pharmacy, and one Assessor of Veterinary Medicine.

The whole range of Pharmacy is under the control of this General Board of Directors.

1. *Scientific Relations.*—As a preliminary condition to being articled to a Pharmaceutist, the youth must have gone through the fourth class of a public school, and pass an examination before the medical inspectorium, to show his sufficiency in languages and natural philosophy. When he has passed this examination, he is during three or four years

apprenticed ; at the termination of which period, he is admitted to the assistants' examination, which consists of compounding a few preparations in the presence of the Assessor of Pharmacy, and giving a circumstantial description of the operations; after which he is admitted to the *vivâ voce* examination, on theoretical and practical Pharmacy, Chemistry, Botany, Pharmacognosia, Zoology, Mineralogy, and Natural Philosophy. The minutes of the examination, together with the preparations he has compounden, are forwarded to the central Medical Council, which, according to the opinion of two of its members, confers on him the degree of *Assistant* of the *first* or *second class*. To obtain the degree of a *Provisor*, the assistant's degree must be of two or three years' date, and then the candidate must go through a course of scientific studies of two years' duration, either in the school of Pharmacy, at Warsaw, or at an Imperial university. The Provisor's examination is practical, as well as by written papers, and by *vivâ voce* examination. It must be passed before the Medical Council at Warsaw, and is far more difficult and more comprehensive than the assistants' examination. When the Pharmaceutist has passed this examination creditably, he is sworn in as *Pharmaceutical Provisor*, and furnished with a diploma to that effect.

Two or three years after this he may aspire to the rank of Apothecary, by passing another examination still more difficult than the former one.

The school of Pharmacy at Warsaw has three professors, and besides being of large extent, contains excellent collections and specimens, and may be reckoned among the best in Europe. The number of students amounts to about sixty. The lectures are all delivered gratis.

2. *Medico-legal Relations.*—In this respect there exist the following standing regulations:—A diploma as apothecary solely entitles a person to keep a shop. Every prescription must, on receipt, be rated and entered into a book,

and the prescription itself numbered according to the apothecaries' book *(protocol)*. On the white or red label (according as the medicine is for external or internal use) must be marked (besides the directions for use) the number in the book, the name of the patient and that of the medical man, the signature of the assistant who made up the prescription, the price, and the date. On the back of the label, a copy of the prescription, which remains in the apothecaries shop, must be written out. Every medicine is to be sent out sealed. Every shop is visited once a year by the Director General himself, or an inspector, aided by the Assessor of Pharmacy. The books of business, which are on these occasions rigidly inspected, are—1, the protocol, or prescription-book; 2, the book of sale over the counter; 3, the laboratory ledger; 4, the stock-book; 5, the poison-book; 6, the journal of correspondence with medical or other authorities. The central council publishes every year a list of all Physicians and Apothecaries in the kingdom, and a list of prices according to the fluctuations of the market, calculated by the medical authorities. Every Apothecary is regarded and treated as a servant of the state, and every shop as a government institution. After a series of years, the Apothecary is pensioned as a servant of the state, or in case of offence punished as such. Every Apothecary is exempt from billet or taxation. Every Pharmaceutist, from the apprentice upwards, is exempt from military service. Christians are alone permitted to enter on a Pharmaceutical apprenticeship. The number of Apothecaries is strictly regulated in accordance with the population, so that the establishment of a new shop is only allowed in extraordinary cases, and then merely when the authorities of that district, and all Apothecaries within twenty-four miles of that place, consider the institution of a new shop imperatively necessary.

The supply of crude materials the Apothecary may draw from the country or from abroad, but all preparations he

must compound himself. Consequently there exists no manufactory of medicinal preparations in the kingdom of Poland.

From this report, it is clear that the medical regulations in the kingdom of Poland are efficient, and that the Apothecary in general stands on a high scientific and professional footing, enjoys great protection from the government, and that the medical police regulations are strictly enforced for the benefit of the public in general.—*Pharm. Journ. from Correspondenz-Blatt für Süd-Deutschland.*

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## ART XXVI.—ON THE PRODUCTION OF VALERIANIC ACID AND A NEW SUBSTANCE FROM CASEINE.

By Justus Liebig.

When cheese prepared from fresh or sour milk, and which has been well pressed and freed as much as possible from adherent butter, is kept with an equal weight of hydrate of potash (or solution of potash, which would crystallize on cooling) in a state of fusion until hydrogen gas is evolved along with ammonia from the fusing mass, and the residue is then dissolved in hot water, slightly supersaturated with acetic acid, and the filtered solution allowed to cool, a quantity of very minute needles separate, which are very sparingly soluble in cold water and insoluble in alcohol and æther. By repeated solution in water to which some carbonate of potash is added, and precipitated with acetic acid, this body is obtained in perfectly white silky needles. From a preliminary analysis, which requires confirmation, its composition is expressed by the formula $C^{16}NH^{9}O^{5}$. Although readily soluble in alkalies, it combines

with acids. The mother-ley from which this body crystallizes yields, on further evaporation, a considerable quantity of leucine. When the fused mass is supersaturated with tartaric acid instead of acetic acid and the liquid submitted to distillation, an acid product is obtained, which on saturation with barytic water, evaporation to dryness, and submitting the dry barytic salt with phosphoric acid to distillation, yields a colourless oily acid and an aqueous oily fluid possessing the odour and all the properties of valerianic acid. Leucine yields, on fusion with hydrate of potash, ammonia and hydrogen; the residue contains valerianate of potash; the formation, therefore, of the leucine appears to precede that of the valerianic acid when caseine is fused with potash. To within 1 equivalent of hydrogen the formula for leucine expresses the composition of an æther consisting of 1 atom cyanic acid, 1 atom oxide of amyle and 2 atoms water. By passing the vapour of the hydrate of cyanic acid into anhydrous fusel oil, a solid crystalline substance, soluble in water, is obtained, which readily crystallizes from this solvent, and in external appearance has the most striking resemblance to leucine, from which, however, it differs by its solubility in æther.

When the fusion is continued for a longer time, a considerable quantity of butyric acid is obtained along with the valerianic acid. The silver salt, prepared with the oily valerianic acid from caseine, left on combustion 51·62 silver so that its identity with the ordinary valerianic acid cannot be doubted. The crude distillate contains, besides valerianic acid, a volatile substance of the odour of human fæces, which reduced the nitrate of silver, but contained no formic acid; a quantity of the oxalate of potash separated from the alkaline ley previous to its being supersaturated with tartaric acid.

I have not observed in the treatment of caseine with potash, any protide and erythroprotide, names given by Mulder to two smeary syrupy bodies, which he obtained in

the action of potash upon albumen ; nor do I believe that he or any other chemist has ever again obtained them of the same composition as he ascribes to them; for they are nothing more than a mixture of intermediate products, which vary according to the temperature, the duration of the action, and the concentration of the alkali.—*Chem. Gaz., from Liebig's Annalen, Jan.* 1846.

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## ART. XXVII.—ON GUTTA PERCHA, A PECULIAR VARIETY OF CAOUTCHOUC.

By Douglass Maclagan, M. D., F. R. S. E.

Gutta Percha is the Malayan name for a substance which is the concrete juice of a large forest tree native of the shores of the straits of Malacca, Borneo and the adjacent countries. The tree yielding it is unknown botanically, all the information we possess regarding it being that it is a large forest tree, and yields this product abundantly. We are indebted for our knowledge of it to Dr. W. Montgomerie, H. E. I. C. S., whose spirited exertions to improve the cultivation of colonial produce at Singapore have obtained for him several distinguished marks of approbation from the Royal Society of Arts of London. For his communication regarding gutta percha, Dr. Montgomerie received a silver medal from the Society.

This substance in its crude state differs in many particulars from common caoutchouc ; it is of a pale yellowish, or rather dirty white colour ; it is nearly as hard as wood, though it readily receives the impression of the nail. It is very tenacious, and not at all elastic.

It seemed to me to be worth while to determine whether or not this substance really was a variety of caoutchouc, and for this purpose I subjected it to the ordinary process of ultimate analysis, and obtained as its per-centage composition,—carbon, 86·36; hydrogen, 12·15; the remainder, 1·49, was most probably oxygen absorbed from the air during the process employed for purifying it, as the substance, whilst heating on the vapor-bath, acquired a brown colour. The only analysis of common caoutchouc with which I am acquainted is that of Faraday, who obtained, carbon, 87·2; hydrogen, 12·8. The results are sufficiently near to warrant the conclusion, that the two matters in question are generically the same.

I found also that the gutta percha yields the same product of destructive distillation as the common caoutchouc. Without entering into details, I may briefly state, that both equally yield a clear yellow limpid oil, having no fixed boiling-point, and therefore being a mixture of different oleaginous principles. In both instances the distillation proceeds most freely at temperatures between 360° and 390° F., and seems almost stationary at 385°. Comparative analysis of several portions of the two oils were made, and, as is already known of common caoutchouc, the products exhibit a constitution represented by the formula $C^{10} H^8$. The gutta percha thus appears really to be a modification of caoutchouc.

In its general properties it likewise shows a similarity to common caoutchouc. It is soluble in coal naphtha, in caoutchouc oil, and in æther. It is insoluble in alcohol and in water, and floats upon the latter.

Its most remarkable and distinctive peculiarity is the effect of heat upon it. When placed in water at 110°, no effect is produced upon it, except that it receives the impression of the nail more readily; but when the temperature is raised to 145° or upwards, it gradually becomes so soft and pliant as to be capable of being moulded into any form, or

of being rolled out in long pieces or flat plates. When in the soft state, it possesses all the elasticity of common India rubber, but it does not retain these properties long; it soon begins again to grow hard, and in a short time, varying according to the temperature and the size of the piece operated on, regains its original hardness and rigidity. A ball 1 inch in diameter was completely softened by boiling water in 10 minutes, and regained its hardness completely in less than half an hour. It appears to be capable of undergoing this alternate softening and hardening any number of times without change of property.

It is also to a certain extent ductile. When soft it is easily torn across, but when hard it is very tenacious. A piece not an eighth of an inch in thickness, when cold, easily raised a weight of 42 lbs., and only broke when half a hundred weight was attached to it.

From these properties, it seems capable of many applications in the arts. Its solution appears to be as well adapted as that of common caoutchouc for making water-proof cloth; and, whilst softened, it can be made into solid articles, such as knife-handles, door-handles, &c. Malays employ it for the former of these, and prefer it to wood. A surgeon furnished with a small piece, could easily, with the aid of a little hot water, supply himself with bougies or pessaries of any size or form.—*Chem. Gaz. from Edinburgh Philosophical Journal.*

## ART. XXVIII.—ON THE MEDICAL AND ECONOMICAL PROPERTIES OF THE ANACARDIUM OCCIDENTALE, OR CASHEW-NUT TREE.

By W. Hamilton, M. B.

The cashew-nut tree, or Anacardium occidentale, must not be confounded, from the resemblance it bears to the vulgar name of common cashaws, with trees of a widely different character belonging to the genus Acacia, of which I may perhaps have occasion hereafter to take some notice.

The Anacardium occidentale is known in various parts of the West Indies by a considerable diversity of names, of which the most frequent are, *Acajou* and *Pommier d'Acajou* in the French, and cashew apple (evidently a corruption of the French,) and cherry-tree, in the English islands. It is a handsome spreading tree of about twenty feet in height, of quick growth, coming into bearing in the second year from the time of sowing the seed, and continuing to bear fruit for fifty, or even, in some instances, one hundred years. Its timber is hard, close grained, and durable, applicable to many useful purposes. Its trunk and branches yield, on being wounded, during the monthly ascent of the sap, a white and transparent gum, similar in appearance to that of the Acacia vera or gum arabic. Of this gum, which is subastringent, and furnishes a good substitute for gum arabic, a full grown tree will yield an annual amount of ten or twelve pounds. This gum, being unpalatable to insects, is particularly adapted for use where their depredations require to be guarded against. By tapping the trunk, a milky juice is obtained which stains linen of a durable black, and might serve as a marking ink. Three varieties occur, one with red, another with yellow fruit, and a third with fruit streaked with red and yellow.

That these are mere varieties appears from the statement of Mr. A. Robinson, of Jamaica, who informs us, that the nuts of the red variety, when planted, will produce trees bearing yellow fruit; and those from the yellow variety, trees bearing red fruit.

The fruit, termed by the English planters the cashew apple or cherry, is merely an enlarged succulent peduncle, or receptacle, of a pear shape, and bearing at its extremity a reniform nut, adhering to it by the centre of its convex surface. The former is the apple, the latter the cashew-nut, a luxury not unknown at our own tables. The kernel of this nut is enclosed in a hard shell, covered by a thinner membraneous envelope; and between these resides a thick blackish oil, of such causticity as to blister the lips of those who incautiously suffer it to approach them; on this account these nuts are never eaten till after they have been well roasted to dissipate the oil. After this they may be taken with impunity, and ground up with cocoa, as Lunan states (*Hort. Jam.* i. p. 159,) they make an excellent chocolate. Whether Lunan here means the nut of the Cocos nucifera, or of the Theobroma cacao, also called *cocoa*, in vulgar parlance, does not clearly appear.

The caustic oil, of which mention has been made, is useful as an external application, for the removal of freckles and corns, and the cure of malignant ulcers, when diluted with a sufficient proportion of some bland oil; smeared on wood it preserves it from decay, and from the depredations of insects.

The succulent peduncle, which is about the size of a large fig, is an agreeable subastringent fruit, of considerable efficacy as a tonic and diuretic; and Dr. Barham informs us, "that poor dropsical slaves that have had the liberty to go into a cashew-nut walk and eat what cashews they pleased, have recovered." He also states, that "having a large orchard of about three hundred trees, after the market was glutted with them, he distilled a spirit from

them far exceeding arrack, rum, or brandy, of which they made an admirable punch that would provoke urine plentifully." Dancer, in his *Medical Assistant*, states, that "the expressed juice of the fruit in red wine sangaree, is good in female weaknesses," and is effectual as a diuretic in dropsies; adding that, "the Portuguese turn their dirt eating negroes out in the cashew season, and *force* them to eat the fruit."

The fruit roasted when ripe and added in slices to punch communicates an agreeable flavour to it; and if the punch thus prepared be bottled, it soon ferments and becomes a delicious sparkling liquor. Advantage has been taken of this readiness to run into the vinous fermentation, to manufacture an excellent wine from this fruit. The earliest notice I can find of this fact is the following, contained in Lemery's *Dictionnaire des Drogues*, where he says, under the head of "Pomme d'Acajou, cette pomme est d'un jaune rougeâtre, couverte d'une peau mince et tendre, sa chair est spongieuse, empreinte au commencement d'un suc lacteux, acide et astringent; mais sa couleur et le goût de suc se détruisent à mesure qu'il fermente, et il devient vineux, en sorte qu'il enyvre ceux qui en boivent beaucoup." Lunan also observes, in his *Hortus Jamaicensis*, p. 159, published in 1814, that "this juice expressed and fermented makes a fine rough wine, useful where the viscera or solid system has been relaxed." Indeed, the wine so prepared, as I can state from my own personal observation, possesses all the astringency and tonic properties of port wine, and might be made a valuable staple of exportation from our colonies.

But the first individual who can claim the merit of having made this fruit the subject of scientific experiment, was, I believe, my amiable and philanthropic friend, James Webbe Tobin, Esq., of the island of Nevis, whose active and vigorous mind, notwithstanding the disadvantage under which he laboured, of loss of sight, was incessantly

occupied with schemes of general utility, calculated to promote the comforts or add to the happiness of his fellow-creatures.

After a number of experiments, attended with a considerable diversity of success, he at last produced a very palatable wine; and, had it pleased Heaven to have spared his valuable life a few years longer to his young family and his fellow-creatures, there can be little doubt that he would have carried the manufacture of this excellent wine to a still higher degree of perfection.

The following is the process which he found to answer best, and which he communicated to me a short time before the premature termination of his valuable life in 1814:

"Mix two parts of the expressed juice of the fruit with one part of water; putting to every gallon of juice three and a half pounds of the best sugar, and to every gallon of water four pounds; and adding six gills of lime juice for every eight pounds of sugar. Bung the cask down tight before the fermentation has wholly subsided, and fine in the usual way with eggs."

As standing long upon the lees is apt to communicate a disagreeable bitter taste to the wine, not afterwards to be got rid of, it might be an improvement upon Mr. Tobin's plan, to rack it off into a clean cask before the fermentation has wholly subsided, and then to bung the cask tight down; and a further improvement might be perhaps effected by adding some of the extract of the Krameria triandra, which grows in South America, and is employed by the wine merchants in Oporto to improve the quality and heighten the colour of their port wines. A species of the same genus also, the Krameria ixina, grows in Hayti and St. Kitts, the roots of which, no doubt, possess properties similar to those of the species found upon the Spanish main, the medicinal properties of which were so highly eulogized by the late Dr. Rees, under the name of *Rhatany Extract*. The Krameria ixina, whose existence in St. Kitts has escaped the notice of

Swartz, or any other botanist whose works I have met with, was found by me growing on Guinea Corn Hill, at the south-eastern end of the plain of Bassetere, where no doubt it may still be found. In Hayti I met it growing along the foot-path to the deserted plantation Destin, or Tittine, as it is commonly called; the same spot in which I afterwards found it had been previously discovered by the Chevalier Tussax, who has accurately described and figured it in his magnificent "*Flore d'Antilles.*"

In making the cashew wine no addition of yeast is required to make the fermentation commence. When new the wine is agreeably sweet and pleasant; but by age it acquires the roughness and much of the flavour of port, a resemblance which would be greatly increased by the addition of the extract obtained from the krameria.

The subjoined table, which I have calculated from Mr. Tobin's directions, exhibits the relative quantities of water, sugar, and lime juice, for various quantities of cashew juice, and may facilitate future experiments.

| Cashew Juice. | Water. | | Sugar. | | Lime Juice. | | |
|---|---|---|---|---|---|---|---|
| Galls. | Galls. | Qts. | lbs. | oz. | Galls. | Pints. | Gills. |
| 2 | 1 | — | 11 | — | — | 2 | $\frac{1}{4}$ |
| 4 | 2 | — | 22 | — | — | 4 | $\frac{1}{2}$ |
| 5 | 2 | 2 | 27 | 8 | — | 5 | $\frac{5}{8}$ |
| 8 | 4 | — | 44 | — | 1 | — | 1 |
| 10 | 5 | — | 55 | — | 1 | 2 | $1\frac{1}{4}$ |
| 12 | 6 | — | 66 | — | 1 | 4 | $1\frac{1}{2}$ |
| 14 | 7 | — | 77 | — | 1 | 6 | $1\frac{3}{4}$ |
| 15 | 7 | 2 | 82 | 8 | 1 | 7 | $1\frac{7}{8}$ |
| 20 | 10 | — | 110 | — | 2 | 4 | $2\frac{1}{2}$ |
| 25 | 12 | 2 | 137 | 8 | 3 | 1 | $3\frac{1}{8}$ |
| 50 | 25 | — | 275 | — | 6 | 3 | $2\frac{1}{4}$ |
| 60 | 30 | — | 330 | — | 7 | 5 | $3\frac{1}{2}$ |
| 70 | 35 | — | 385 | — | 9 | — | $\frac{3}{4}$ |
| 80 | 40 | — | 440 | — | 10 | 2 | 2 |
| 100 | 50 | — | 550 | — | 12 | 7 | $\frac{1}{2}$ |

By bottling it before the fermentation has wholly subsided, a pleasant sparkling wine may be obtained, more agreeable even than champagne.

In one instance, in which a quantity of this wine was made by a friend, according to Mr. Tobin's receipt, the process appeared to have failed, and the produce was bottled off, under the impression that it might be converted into good vinegar ; but, on opening one of the bottles many months after, when some vinegar was required, my friend was agreeably surprised to find, on drawing the cork, that in place of vinegar, he had a bottle of most delicious sparkling wine. In fact, it had been bottled somewhat too soon, while the process of fermentation was still going on, although in a reduced degree, and thus the escape of the carbonic acid, which continued to be generated, was prevented. How long the wine, bottled in this state of fermentation, could be kept without running to the acetous fermentation, remains to be determined by experiment.

The cashew-tree being easily raised from seed, coming into bearing within twenty-five months from the time of sowing, bearing its fruit in profusion, and continuing to bear abundantly for a long succession of years, there can be little doubt, that if a market could be found for its products, its cultivation would soon attract a degree of attention not hitherto accorded to it. These products are, 1. The gum which exudes from the wounded bark, of which between 3 and 4000 pounds might be annually obtained from a plantation of only 300 trees. This gum, from its subastringency, possesses many advantages over that of the Acacia vera, for a variety of purposes, those especially, in which it is desirable to guard against the depredations of insects, to whom this astringency is repulsive. 2. The leaves, which in decoction, form a good lotion for bad ulcers. 3. The milky juice, which is obtained by tapping the trunk, and which, as Long suggests, might probably be converted, by evaporation, into a valuable varnish. 4. The caustic oil obtainable from the nuts, which is so valuable as a preservative of timber from the assaults of insects, and probably also from the growth of those fungi which occasion

what is commonly called *dry rot*, and when mixed with tar, would, in all likelihood, be found useful for covering the bottoms of ships. As an escharotic, it forms, when carefully applied, a good remedy for the removal of callosities, such as warts and corns; and as a stimulant application, may be employed to restore a healthy action in cases of herpes, ill conditioned ulcers, &c., being first diluted to the proper degree with some mild oil. Similarly diluted, but to a still greater extent, it becomes a safe and certain cosmetic, by exciting an inflammatory action, which produces desquamation of the cuticle. Two young women of colour in Nevis, anxious to improve their complexion, employed this oil without due caution, and excited a degree of inflammation so violent, as to cause intense suffering, and endanger their lives; by careful and judicious treatment however, the inflammatory action was conducted, at the end of about five or six weeks, to a happy termination, and the vanity of the young ladies amply gratified by the brilliancy, clearness, and beauty of their new complexion. Whether they had occasion, or felt an inclination to repeat the experiment, I was not fortunate enough to learn. 5. The spirituous liquor which may be obtained by distillation from the fruit, and which, according to Dr. Barham, possesses the same diuretic properties as the best Hollands; and 6. The wine prepared from the fermented juice expressed from the fruit, and which, if improved by the addition of a due proportion of the extract of the roots, either of the Krameria triandra, which is found on the Spanish main, or the Krameria ixina (which I found near the ridge of Guinea Corn Hill, to the east of the ponds of Basseterre, and may exist in other parts of the island which I had not an opportunity of examining,) and kept in bottle for some years, would equal in flavour the best port of Oporto, and not improbably combine, with the tonic and astringent properties of the Portuguese wine—properties to be chiefly ascribed to the krameria extract, or "wine colouring," added to

by the merchants—those diuretic properties which so strongly characterize the fruit of the anacardium in its recent state. To these products may be added a 7th, the nuts, which, after the separation of the caustic oil, would be found desirable additions to an English dessert. And, 8th, the timber of the trees, after they have ceased to bear, and which, from its strength and durability, is extremely valuable.

Hence it is perhaps questionable, whether an acre of land planted with cashew trees (which demand little of human labour, and that of the least exhausting kind, and are not exposed to the innumerable casualties of the cane,) would not be found to yield a net produce, upon an average of years, superior to that of sugar—especially as land no longer suitable for the cane, might be still rendered productive as a cashew orchard.—*Pharm. Jour.*

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## ART. XXIX.—ON THE TEMPERATURE OF THE WATER USED IN THE PREPARATION OF INFUSIONS.

By Mr. Thomas Greenish.

The most desirable temperature for the water used in the preparation of some of the infusions of the Pharmacopœia, having been casually discussed on several occasions at our evening meetings, and my experience inducing me to differ from the opinions then expressed, it occurred to me that a few remarks on the subject might be productive of some benefit, more especially as it has again been adverted to in a paper read at the October Meeting, on the subject of a National Pharmacopœia. It is unnecessary before this

Society to dwell on the importance of these preparations, the attention which has been already bestowed upon them is a sufficient evidence that they are by no means disregarded.

I shall confine myself on this occasion to the consideration of the methods which have been recommended for the preparation of infusion of calumba. This infusion is in frequent use, and is one of those most difficult to preserve from undergoing decomposition. Many Pharmaceutists recommend that the water for the preparation of this infusion should be either cold, or considerably under the boiling temperature, and the cold infusion, by percolation has received the sanction of the Edinburgh College. I shall therefore endeavour, as briefly as possible, to state the result of some experiments I have made with reference to this infusion.

An infusion of calumba made with cold water, after being allowed to stand the specified time, which is two hours, and then strained off, will be very bright and free from starch; whilst on the other hand, if made with boiling water, it will contain a considerable quantity of starch, and will not be quite so bright. The latter difference is caused by very fine particles held in suspension, which gradually subside; the difference between the two in strength and aroma appears quite trifling and unimportant.

If portions of the two infusions be kept under similar circumstances, that made with cold water will be observed to be several hours in advance of the other in the commencement and progress of decomposition; and if it be warm summer weather, symptoms of incipient change will very rapidly appear, being indicated by a general cloudiness, and the accumulation of small particles of insoluble matter on the surface of the hitherto bright infusion, which gradually extend themselves throughout the entire fluid. The precise time at which this takes place, will of course depend much on the state of the weather. The change, when it becomes visible, in the infusion made with boiling

water, does not proceed so rapidly as in the one made with cold water, and if the infusion be examined from time to time during the progress of the decomposition, the large quantity of starch which it originally contained, will be found to be gradually disappearing, and ultimately a solution of iodine will not detect its presence—it will have totally disappeared.

Now the two substances which appear to be principally concerned in these changes, are, vegetable albumen and starch; and these bodies are known to be present in considerable quantity in calumba root.

Albumen, when in solution, is especially characterized by great instability, mere contact with atmospheric air being sufficient to induce rapid decomposition. Starch, on the other hand, is a much more stable body, and the changes which it undergoes are generally induced by the presence of some albuminous matter acting as a ferment.

When the infusion is made with cold water, the albumen is dissolved out from the root unaltered, and the presence of this body soon gives rise to decompositions which render the infusion unfit for use.

If the infusion be made with boiling water, the albumen will be partially coagulated, rendered less soluble, and not so liable to undergo decomposition. Nevertheless, it is probable that a portion of albuminous matter taken up, even in this case, by the water, is the cause of the subsequent change which is found to take place in the starch. Thus I find that if an infusion, whe her made with cold or with boiling water, be subsequently heated to the boiling point, it will keep for a much longer time, without undergoing decomposition, than it otherwise would; and this seems to indicate the necessity of scalding out the infusion jug before making this infusion, so that the temperature of the water should be as near the boiling point as possible.

There are no doubt some cases in which it may be desirable to avoid the presence of starch in preparations of this kind, and this can only be effected by the use of cold or

tepid water; but the increased tendency of infusion of calumba, when thus prepared, to undergo decomposition, shows, I think, that there are serious objections to the general adoption of that mode of making infusions.—*Ibid.*

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## MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

A stated meeting of the Philadelphia College of Pharmacy, was held Ninth month 29th, 1845.

Charles Ellis, first Vice President in the Chair.

The Committee appointed at the last stated meeting, on the financial condition of the College, &c., reported progress, but are not prepared to make a final report. They are continued, to complete the object of their appointment.

The Committee appointed to publish a new edition of Latin Labels, reported that they had completed the publication, and are continued to make a statement of the expenses incurred.

The proposition to alter the By-Laws, submitted at last meeting, now claiming attention, it was on motion resolved, that law 7th, section 1st, shall read as follows:

"The stated meeting of the College for the transaction of business, shall be held on the last Monday of March and of September."

On motion, a Committee of three was appointed to assist the Secretary to revise and publish the Rules, Regulations and By-Laws of the College, with a list of the members.

A specimen of Blue Mass, manufactured by George W. Ridgway, was submitted for examination.

The following members were elected Trustees for one year, viz:

| | |
|---|---|
| Thomas P. James, | Jacob L. Smith, |
| Dr. Robt. Bridges, | Henry W. Worthington, |
| A. J. Duhamel, | Ambrose Smith, |
| Jas. L. Elliott, | Robt. Shoemaker. |

Then adjourned.

A stated meeting was held Third month 30th, 1846.—Present 22 members.

Daniel B. Smith, President, in the Chair.

The minutes of the Board of Trustees were read and adopted.

Since the last meeting of the College, the following gentlemen have been elected members of the College by the Board, viz: William Ellis, Samuel P. Thompson, Peter Babb, Benjamin J. Ritter, Wm. H. Needles, Robert C. Brodie, Daniel S. Jones, John Reakirt, Samuel N. James, Henry W. Gillingham, J. R. Taylor, J. P. Wilson Neill, Wm. J. Jenks, and Alexander F. Hazard. The Board also recommended to the College the names of John C. Baker, Wallace Marshall, Henry H. Kelley, Daniel L. Miller, Jr., James N. Marks, and Ellwood Wilson, M. D., who being separately ballotted for, received the requisite number of votes, and were declared duly elected resident members.

The Committee on Finance, reported progress but were not yet prepared to make a final report, and are continued for that purpose.

On motion, it was resolved, That the Publishing Committee be authorized to pay over to the Finance Committee such sum as they may be able to spare from the funds of the Journal of Pharmacy. Also, Resolved, that the Committee of this College on Latin Labels and Patent Medicine Directions, are both hereby authorized to pay over to the Finance Committee, any moneys which may be in their

hands, or which may hereafter accrue as profits from said publications, and that the said Finance Committee are directed to apply such amounts as they may receive, to the liquidation of the stock debt of this Institution.

It was further Resolved, That the Professors be required to pay into the hands of the Treasurer 12½ per cent of the nett proceeds of all the money received from the sale of tickets to the Lectures, in addition to the Matriculating fee—the arrangement to continue for three years.

The following resolution offered by the Finance Committee was on motion adopted.

The following named members of the Philadelphia College of Pharmacy, having relinquished to the College one share of its Loan, amounting to $100 each, provided they are exempted from further contribution; therefore, Resolved, That Samuel F. Troth, Thomas Oliver, Jacob Bigonet, George D. Wetherill, Joseph C. Turnpenny, and John Goodyear, be exempted from further contributions to this Institution.

The Committee on Latin Labels were not yet prepared with a statement of their accounts, and are continued to make a written report to the next meeting.

The Committee appointed in conjunction with the Secretary, to revise and publish the rules and Regulations of the College, with the By-Laws, list of members, &c., reported that they had attended to the subject, and that a copy was prepared for publication. They are continued to complete the service.

A report from the Publishing Committee was read and adopted, by which it appears that they have entered on the publication of the 18th volume of the Journal, and a lively interest continues to be manifested in this interesting periodical by the members of the profession in this and other States. There are some outstanding debts yet to be collected, and a small capital of about 200 dollars has accumulated in favor of the Publishing Committee.

A memorial was read, signed by Wm. Procter, Jr., A. J. Duhamel, and Edward Parrish, accompanied by the following resolution :

Resolved, That a committe of nine members be appointed to take into consideration the propriety of creating a new professorship, the occupant of which shall be called "The Professor of Theoretical and Practical Pharmacy"—and if they deem it expedient, to mature a plan for the consideration of a future meeting.

After an animated discussion, the resolution was adopted, and the President appointed the committee.

It was Resolved, That a Committee of two members be appointed to assist the Treasurer in collecting the arrearages due the College. Samuel F. Troth and Edward Parrish, were appointed by the Chair.

The following proposition was submitted by the movers, and is laid on the table for consideration at the next stated meeting :

We propose to the Philadelphia College of Pharmacy that law 5, section 1st, be amended by striking out the following words :

"The number of resident members shall not exceed 100."

SAMUEL F. TROTH,
JOSEPH C. TURNPENNY.

This being the usual time for the annual election, it was moved to proceed therein, and the following members having received a majority of votes for the offices attached to their names were declared duly elected.

*President,*
DANIEL B. SMITH.

1*st. Vice President,*
CHARLES ELLIS.

2*d. Vice President,*
SAMUEL F. TROTH.

*Treasurer,*
JOSEPH C. TURNPENNY.

*Secretary,*
DILLWYN PARRISH.

*Corresponding Secretary,*
WILLIAM HODGSON, JR.

*Trustees,*

JOHN H. ECKY, EDWARD PARRISH,
JOSEPH CARSON, M. D., JOHN HARRIS,
WILLIAM PROCTER, JR. ALBERT L. LETCHWORTH,
WARDER MORRIS, WILLIAM P. TROTH.

*Publishing Committee,*

DR. ROBERT BRIDGES, A. J. DUHAMEL,
WILLIAM PROCTER, JR., CHARLES ELLIS,
AMBROSE SMITH.

A special meeting of the College was held Fifth month 4th, 1846.—Present 18 members.

DANIEL B. SMITH, President, in the Chair.

The President announced that the meeting had been called to receive the report of the Committee of Nine, appointed to consider the propriety of creating a Professorship of Pharmacy. The following report was then read and considered, and unanimously adopted:

*To the Philadelphia College of Pharmacy.*

The Committee to whom was submitted the proposition made at the last meeting of the College, for the establishment of a professorship of Pharmacy, having deliberately considered the subject, have agreed upon the following report.

The original objects contemplated in the establishment of the College, appear to have been various. The protection of the drug market from adulterated and spurious articles; the discouragement of quackery and deception in drugs; the collection of a scientific library for the use of

druggists and apothecaries; and the adoption and publication of approved formulæ, appear to have been prominent features in the plan of its founders; yet it will be seen by reference to the minutes that the establishment of a School of Pharmacy was early an object of paramount concern with the members of the College, and has always been regarded as the chief means of correcting the abuses which had obtained in the profession, and of placing it on the respectable footing it ought to possess as a branch of the science of medicine.

In organizing the School of Pharmacy, it was found necessary to seek professors in the ranks of the medical profession—few, if any, of the Apothecaries had so accustomed themselves to the systematic study of the several branches connected with the practice of our profession, as to be prepared to assume the office of teachers. Hence it is not surprising that the theory and practice of Pharmacy, although held to be of the highest importance to the student, was not allotted to a professor as a separate branch of instruction, but was appended secondarily to the branches of materia medica and chemistry. The question now arises whether, by the lectures in our school, and by other means tending to create a greater taste for scientific attainment among those who practice our profession, so much advancement has been made, as to warrant the appointment of a practical Apothecary to teach, in a scientific manner, what has hitherto, in America and England, been the confused and unsystematized art of Pharmacy. This is the question which the College is now called upon to decide. It is obvious that an imperative demand exists, either for some change in the organization of the School of Pharmacy, by which our graduates may be instructed in this branch, or for additional regulations limiting or altering the terms of graduation, so as to deprive of the degree that class of students, who, from the circumstances in which they are placed, and from no fault of their own, cannot become fully quali-

fied for the practice of Pharmacy. This class of students, it is believed, constitute the larger portion of those attending the lectures. All apprentices engaged in wholesale stores are included in it, besides many who are brought up in *retail* establishments. When we consider that apothecaries, as at present existing, are men of every degree of attainment, from the mere pretender, to the accomplished Pharmaceutist, some of them owing their instruction to a brief term of apprenticeship in which their opportunities were extremely limited, and many of them following the business with a stock of knowledge altogether inadequate to its proper prosecution, we can be at no loss to account for the fact so often apparent to those who have served on the Examining Committee, that students coming from such preceptors frequently manifest gross ignorance in regard to Pharmacy, though by the Lectures in the School they may have acquired a considerable knowledge of Materia Medica and general Chemistry.

That Pharmacy is a branch of knowledge distinct from Chemistry and Materia Medica, no one will deny, and that its teacher should be practically familiar with its rules, and operations is equally evident. The time devoted by the Professor of Materia Medica to teaching his branch is hardly sufficient for him to do full justice to it if kept within its legitimate bounds, and if he attempt an extended view of Pharmacy, it must evidently be at the expense of his own important subject. Hence we find that Pharmacy, as at present taught by the Professor of Materia Medica, is limited to a cursory notice of the more prominent preparations of drugs, introduced as occasion offers in the course of his lectures. To any one at all acquainted with the extensive duties that appertain to the chair of Chemistry, it will be obvious that the time devoted to them is sufficiently brief, without the frequent digressions now required in illustrating the Pharmaceutical preparations.

Your Committee believe, if a course of lectures on Phar-

macy were added to those already delivered, in which the most recent and approved methods of manipulation were taught, and the best kinds of apparatus exhibited; and if these were followed by a thorough and detailed application of them in the preparation of medicines, in many instances repeating the operations before the class, and in all cases exhibiting the preparation in its most perfect condition, that the student would be able to correct the knowledge derived at home, and the Pharmacy of the city, so far as the graduates of our school are concerned, would be rendered more perfect and homogeneous in its character than at present.

Those who have not given attention to this subject, may be disposed to inquire what topics would be presented in a course on Pharmacy: we will therefore attempt a sketch of the subject coming under that head.

It is the province of the Professor of Chemistry to explain the theory of Caloric and the laws which govern its influence on matter in the abstract; it would be the duty of a teacher of Pharmacy to show *when* its influence is required in acting on matter destined for medicinal use, *how* it is best applied in effecting the modifications desired, and *what* the means and instruments are by which its power is controlled and directed to the end in view. In accomplishing this task, he would treat of the action of liquids on solids, when assisted by different degrees of heat, as in preparing infusions, decoctions, &c.; of the distillation of fluids, and the necessary apparatus required in its performance, explaining in his progress the precautions requisite to insure success. The important operation of concentration by evaporation, would require his attention to the various means of evaporating by steam, water and sand baths, as well in vacuo as in the open air; and its applications in the preparation of vegetable extracts, in the crystallization of saline solutions, &c., would be numerous and important. Again, he would have to illustrate the furnace operations called for in Pharmacy, in which the processes of roasting,

calcination, ignition, fusion, reduction, carbonization, incineration, &c., are conducted. On the theory of the formation of crystals and their geometrical relations, he would have little to say, but the means of controlling the cooling of saturated solutions of crystallizable matter, of gradual evaporation, and the shape and position of the vessels in obtaining good crystallizations, he would probably fully explain.

The division of drugs by bruising, grinding, rasping, &c., as preliminary to the important operation of pulverization, which latter in all its phases, together with the mortars, mills, sieves and other instruments which are employed in accomplishing it, and the various precautions necessary in effecting the proper division of drugs, would be expatiated upon and applied.

The means of extracting the activity of substances by maceration and displacement, as in the preparation of extracts, tinctures, wines, syrups, &c., would, we doubt not, receive a large share of attention, inasmuch as these classes of preparations embrace very many of the most important medicinal agents.

After giving a thorough examination to all the elementary operations of a Pharmaceutical Laboratory, the officinal preparations of the Pharmacopœia in classes, would afford a wide field for illustration, in which the knowledge communicated in the previous lectures could be profitably applied. Extemporaneous Pharmacy, or the knowledge required in compounding prescriptions, is so various in its character, is effected by so many unforseen circumstances, and requires such constant presence of mind in its application, that it can only be properly acquired by long practice in the shop; yet by a judicious selection of difficult prescriptions, and of cases where, from professional ignorance or carelessness, it becomes the duty of the Apothecary, either to pause until an explanation has been had of the Physician, or to assume the responsibility of a change in the

prescription when the error is obvious and life is concerned; the teacher of Pharmacy might do essential service to many of the students by giving general currency to a system of precautions now mostly confined to the establishments of the more enlightened apothecaries. In the practice of extemporaneous Pharmacy, perhaps no kind of information is more requisite than a knowledge of nomenclature, both recognised and obsolete. The medical corps. in a large city, is composed of individuals of various ages and from different countries, whose alma mater, scattered over Europe and America, recognise standards of unlike nomenclature, and the dates of whose accession to the profession range through a period of half a century. The ideas of nomenclature imbibed during the term of their collegiate studies are generally the most lasting, and hence it is that in this age of scientific exactness, we find occasionally prescriptions written as in the days of Stahl and Glauber, calling to mind the reign of Phlogiston. The periodical variations in our own Pharmacopœia, and in those of Great Britain frequently perplex the Apothecary, and demand an extensive acquaintance with the subject. We therefore infer, that a professor of Pharmacy would see the importance of instructing the students upon this branch, so as thoroughly to arm them against difficulties to which they must be liable in the practice of their profession. A knowledge of Toxicology is generally considered of great importance to the Apothecary, and no one will deny its occasional utility. The Professors of Materia Medica and Chemistry dwell on this subject, so far as it relates to the vegetable and mineral poisons occurring in their respective courses. It would be an appropriate subject for a few lectures from the proposed Professor of Pharmacy, in which a lucid and systematic review of the more prominent poisons and their antidotes, with instructions relative to the preparation and administration of the latter, and the proper precautions to be observed in vending the former, would be found ex-

tensively useful to the student, as we believe there are few subjects of like importance upon which our graduates are at present so deficient. From what has been said, it will be apparent that the Professor of Pharmacy, if one should be elected, must enter a field of labor scarcely less extensive than that of either of his colleagues in the school, and one which he will have to traverse in the double capacity of teacher and learner. We look in vain amongst the medical literature of the English language for a single work devoted exclusively and systematically to this branch of knowledge. To French and German Pharmaciens and books we are indebted for most that is interesting, instructive and original in regard to Pharmacy. The latter are only available to a limited extent in this country, and are not well adapted to our different circumstances.

We would suggest, that as Philadelphia was the first city in the Union to organise a College of Pharmacy, and has continued to be regarded as the metropolis of Pharmaceutical as well as Medical Science in America, it is peculiarly appropriate that this measure, so imperatively demanded by our present circumstances, and so necessary to an advancement of our profession, corresponding with the progress of science and general intelligence in our country, should be consummated here.

It would probably be the means of adding to the class a large number of students from a distance, and of diffusing a knowledge of correct principles, and uniform practice among Apothecaries throughout the country, which would be a source of increased revenue to the College, and of commendable satisfaction to its members.

With reference to the time of delivering the proposed course of lectures, no difficulty is presented as at first may appear. By each professor giving two lectures a week, instead of three as at present, and by continuing the course six weeks longer, commencing about the second week in October, and ending in the fourth week of March, the whole ground could be traversed without imposing greater

burthens upon the students than at present, at the same time that forty additional lectures would be communicated. Your Committee therefore recommend the adoption of the following resolution.

*Resolved,* That the report of the Committee on the establishment of a Professorship of Pharmacy be referred to the Board of Trustees, with instructions to take the necessary measures for establishing the said Professorship.

DANIEL B. SMITH,
WILLIAM PROCTER, JR.,
A. J. L. DUHAMEL,
EDWARD PARRISH,
SAMUEL F. TROTH,
CHARLES ELLIS,
JOSEPH C. TURNPENNY,
JOHN H. ECKY,
WM. J. JENKS.

*Philadelphia*, 5th mo. 4th, 1846.

The report and accompanying resolution were unanimously adopted.

From the Minutes.

DILLWYN PARRISH, *Secretary.*

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At a special meeting of the Board of Trustees of the Philadelphia College of Pharmacy, held Sixth month 1st, 1846,—On motion of Augustine J. L. Duhamel, it was resolved to proceed to the election of an occupant for the new professorship in the School of Pharmacy; whereupon, WILLIAM PROCTER, JR., was unanimously elected Professor of Pharmacy.

EDWARD PARRISH, *Secretary.*

## COMMENCEMENT.

At a public Commencement of the Philadelphia College of Pharmacy, held on Wednesday evening the 15th of April, 1846, the degree of "*Graduate in Pharmacy*" was conferred upon the following gentlemen, pupils in the Institution :—

| | | |
|---|---|---|
| William B. Webb, | Thesis on | Rubus villosus. |
| William N. Needles, | " | Cornus Florida. |
| Caleb H. Keeney, | " | Rubus villosus. |
| Joseph Allen McMaken, | " | Marrubium vulgare. |
| Thomas Leidy, | " | Scutellaria lateriflora and hyssopifolia. |
| Robert M. Patterson, | " | Morphia. |
| Peter T. Wright, | " | Leontodon taraxicum. |
| George W. Patrick, | " | American Bromine. |
| John Dickson, | " | Camphora. |
| Charles F. Stoever, | " | Hedera helix. |
| Thomas James Scott, | " | Syrupus Ipecacuanhæ. |
| Jacob L. Baker, | " | Sabbatia angularis. |
| Benjamin R. Smith, | " | Diospyros Virginiana. |
| Robert England, | " | Gillenia trifoliata. |
| Hiram C. Lee, | " | Impure Carbonate of Zinc. |
| John A. Whartenby, | " | Matico. |

The valedictory address was delivered by Prof. Carson.

Extracted from the minutes.

EDWARD PARRISH, Secretary.

# MISCELLANY.

*On some new substances from Tobacco.*—By M. Barral.—The juice obtained by digesting tobacco-leaves in water is strongly acid. This acidity has been attributed by Vauquelin to the presence of malic acid: but on crystallizing the syrup, either under the air-pump or at a gentle heat and exposure to the air, I obtained an acid in micaceous lamellæ, soluble in water, yielding an insoluble salt of lead and crystalline combinations with ammonia, nicotine, potash, &c.

This acid, which I shall call *nicotic*, is represented by the formula $C^3\,H\,O^3 + H\,O$, and its lead and silver salts by $C^3\,H\,O^3 + PbO$ and $C^3\,H\,O^3\,AgO$. The great tendency which this acid has to form double salts, and all the reactions which it yields, lead to the presumption that the preceding formulæ should be doubled. It is decomposed by heat and sulphuric acid into acetic and carbonic acids.

This acid appears to stand in the same relation to metacetonic acid as oxalic acid does to acetic acid.

The essence of tobacco or *nicotianine* contains nitrogen; on distillation with potash it yields nicotine. Its composition is—

| | |
|---|---|
| Carbon | 71.51 |
| Hydrogen | 8.23 |
| Nitrogen | 7.12 |
| Oxygen | 13.12 |

*Chem. Gaz. from Comptes Rendus.*

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*Employment of Rochelle Salt in Dyeing.*—By J. A. Benckiser.—The potassio-tartrate of soda may be substituted in all cases in the dyeing of wool, both for the crude as well as for the purified tartar; it has even several advantages over it. It is pure, always of the same composition, and readily soluble in water, while the bitartrate of potash is so frequently mixed with foreign ingredients that often only 50, rarely more than 70 per cent. of pure bitartrate can be obtained from it. The impurity in the colour of the tartar may very readily injure that of the cloths; the fibrous parts of the tartar adhere to the wool, and the fragments of sulphur which frequently occur in it make spots; moreover, a portion frequently remains undissolved in the water, and is lost. The

potassio-tartrate of soda is capable of decomposing a larger quantity of alum, sulphate of iron, tin, salt, &c., the whole of the tartaric acid combining with the alumina or the metal by double decomposition. Instead of 100 lbs. *Cryst. tartari* (price 70*s.*,) there is required only 66 lbs. of Rochelle salt (price 52*s.*)—*Ib. Archiv. der Pharm.*

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*Bologna Catechu. Partiglie di terra catecu Aromatica of the Italians.*—By M. Dorvault.—The following formula for this preparation is of Italian origin:—

| | |
|---|---|
| Extract of liquorice by infusion - | } *aa* 10 grammes. |
| Water - - - - - - - | |

Place it in a sand-bath, and add, - - - -

Bengal catechu, in powder 30 grammes. - - -

Gum in powder, - - 15 grammes. - - -

Evaporate it to the consistence of an extract, and then incorporate the following powders, which must be exceedingly fine:—

| | |
|---|---|
| Mastic - - - - - | } *aa* 2 grammes. |
| Cascarilla - - - - | |
| Charcoal - - - - | |
| Florence iris - - - - | |

Let the mass become of a proper consistence, remove it from the fire, and add, - - - - - - - -

| | |
|---|---|
| English essence of peppermint. - - - - | } 2 grammes. |
| Tincture of amber - - | } *aa* 5 drops. |
| Tincture of musk - - | |

Pour it on to a slab of marble, previously greased, and roll it out by means of a rolling pin to the thickness of a half-franc piece. When the mass is cold, rub it with a piece of blotting-paper, to remove the oil completely from both surfaces; then slightly moisten both sides, and spread silver leaf over them: allow it to dry; cut the sheet into narrow strips, afterwards cut the strips into very small squares or lozenges (about the size of the seeds of fenugrec.)

The catechu that is brought from Italy is contained in small oval deal boxes, weighing about 20 grammes, and covered with a large seal of red sealing-wax.

We do not give this receipt as the true one—the latter appears to be the secret of one or two Bolognese pharmacopolists—but merely as a formula producing an article that will in every respect answer the purpose of the Italian preparation.

The Bologna catechu is a pleasantly-tasted preparation; it is as frequently taken as a sweet-meat, as a medicine, and we must attribute

to it the tonic and carminative properties of the substances of which it is composed.

Two or three pastilles, or grains, are sufficient to give the breath the most agreeable perfume and freshness.

The Bologna catechu corrects the bad breath caused by affections of the stomach, decayed teeth, &c.; and smokers frequently use it to conceal the smell of tobacco. In most parts of Italy the richer classes always carry it about with them, and take it as a pastime.—*Chemist, from Journal de Pharmacie.*

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*Chemical Examinatioa of Sassafras Root*—By Dr. Hugo Reinsch.—Dr. Reinsch analysed the *bark* of the root, which contains a much larger portion of the active constituents than the wood. His results are as follows:

| | |
|---|---|
| Water | 90 |
| Heavy volatile oil, Light volatile oil, Camphoraceous matter | 8 |
| Tallowy matter | 8 |
| Balsamic resin, Wax | 50 |
| *Sassafrid* | 92 |
| Tannic Acid | 58 |
| Sassafrid, tannic acid and gum | 68 |
| Atbumen | 6 |
| Gum, red colouring matter, and salts | 30 |
| Starch, Reddish brown colouring matter, tannic acid, and salts | 54 |
| Starch, tannic acid, &c., extracted by a solution of caustic potash | 289 |
| Insoluble woody fibre | 247 |
| | 1000 |

The substance called *sassafrid* is a peculiar principle, which may be arranged with tannic acid. It is difficultly soluble in water, but soluble in ether and alcohol. It communicates a dark colour to alcohol.

Sassafras *wood* freed from the bark yielded similar results; but it contained scarcely half the quantity of the constituents which the bark yielded, and the volatile oil was even in still smaller quantity. This fact is especially worthy of notice, because we, in general, obtain from Druggists the wood already cut, the bark being previously removed and sold separately.—*Ibid, from Buchner's Repertorium.*

*The means of ascertaining the efficacy of Digitalis.* By M. Falken.—According to M. Falken. the following plan is a means of ascertaining, in an infallible manner, whether or not digitalis possesses its virtues.

50 centigrammes of the powder of the leaves of digitalis are to be infused in boiling water, and after an hour to be strained off. When cold 20 to 30 drops of a solution of ferrocyanide of potash are added, prepared with 75 centigrammes of this salt, to 15 grammes of distilled water.

If the digitalis is active, the infusion becomes rather clouded, but if the cloud does not appear before ten or fifteen minutes, we may consider the digitalis as not possessing a sufficient degree of activity.

According to M. Falken, the digitalis grown in Switzerland has proved the most active.—*Ibid.*

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*Dr. Goudret's Ammoniacal Blistering Ointment.*—The following improved formula for this application is recommended by the author in in preference to that which has hitherto been in use:

Take of Lard - - - 32 parts
Oil of Almonds - - 2 "

Melt the lard with the oil by the application of a gentle heat; pour them in the melted state into a wide-mouth bottle, and add

Solution of Ammonia - - 17 parts

Mix, by continual agitation, until it becomes cold. It is necessary to avoid the application of much heat in the preparation of this ointment. When well prepared it will produce vesication in about ten minutes and will retain its properties unimpared for about a month, if kept in a well stopped bottle.—*Ibid. from Journal de Pharmacie.*

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## ELLIS'S MEDICAL FORMULARY.

Correction.—*The Publishers of this Work respectfully request those persons who have the seventh edition, to correct a tyrographical error for the* "MEDICATED HYDROCYANATE OF POTASSA," [*cyanide of potassium,*] *at page 83; wherein the symbol for an ounce is used in place of that for a drachm. The following is the correct prescription, and corresponds with the proportions directed in all the previous editions of the Work:*

℞. Potassii hydrocyanici medicati, ℥j.
Aquæ destillatæ, Oj.
Sacchari purificati, ℥iss.
Fiat solutio.—Dose, a table-spoonful, night and morning.

## CONTENTS.

## MISCELLANY.

THE

# AMERICAN JOURNAL OF PHARMACY.

OCTOBER, 1846.

## ART. XXX.—OBSERVATIONS ON THE FRUIT OF DIOSPYROS VIRGINIANA.

BY BENJAMIN R. SMITH.

(*Extracted from an Inaugural Essay.*)

(1.) A quantity of persimmons gathered toward the latter end of August, were beaten to a pulp and treated with water, the solution was filtered in order to render it perfectly clear. To separate portions of the liquor, solutions of gelatin, sulphate of quinia and sub-acetate of lead were added; they all caused copious, white, flocculent precipitates. The precipitate with lead was thrown on a filter, and in the course of half an hour passed through all the changes, from white to a dark orange, and finally to a deep brownish black. A solution of sulphate of iron coloured the infusion a deep purple. Both nitric and sulphuric acids threw down precipitates, the former of a dirty orange colour, the latter white. After the infusion had been submitted to the action of sub-acetate of lead, and filtered, a solution of gelatin had no effect on the filtered liquor, and sub-acetate of lead had no effect on the liquid filtered from a precipitate with gelatin, so that whatever be the principle to which the persimmon owes its astringency, these

experiments clearly prove that both lead and gelatin combine with the whole of it, and with all, should there be more than one. Upon evaporating the liquid after precipitation with gelatin, a saccharine mass was left, which was not crystallized by evaporation in a drying room; this sugar was treated with sulphuric acid, which dissolved the whole of it. Some of the persimmons were boiled in water and tested for starch, but without effect. Alcohol had no effect on the aqueous infusion of persimmon. The residue from the infusion had all the characters of lignin.

(2.) A quantity of green persimmons gathered in September, were digested in alcohol, till all the matter soluble in that menstruum was taken up. The residue was boiled in water for some minutes, and tested for starch, but without effect; the tincture was very astringent, and exhibited all the properties noticed in the aqueous infusion; it was not clouded by the addition of water. This tincture was submitted to spontaneous evaporation; after standing for some days it was converted into a thick jelly, which was slightly astringent, but very sweet; it was evaporated to dryness, when it entirely lost its astringency. This substance was boiled in alcohol, which dissolved a part of it; this being evaporated, proved to be the saccharine mass spoken of above. A solution of sulphate of iron turned a solution of this sugar slightly purple, and sub-acetate of lead threw down a slight precipitate. The remaining solid resembled resin in its appearance; it was insoluble in boiling water and alcohol, and but very slightly soluble in boiling spirits of turpentine. A portion of this substance was submitted to the action of heat in a test tube; it did not blaze, but burned away evolving much smoke, and with a disagreeable smell like the burning of vegetable oils; 13 grs. of carbon were left after burning 60 grs. of this substance. The residue left when the tincture was filtered was boiled in water, and the water evaporated; after standing a day, crystals were formed on the sides of the dish. A solution of

baryta precipitated a solution of these crystals, and as neither nitric nor muriatic acids decomposed the precipitate. the salt was inferred to be a sulphate, and from the taste, and the fact of its decrepitating in the flame of a lamp, it was supposed to be a sulphate of potassa.

From 600 grs. of green persimmon, freshly gathered, there was obtained :

| | |
|---|---|
| Of insoluble resinous matter - - - - | 119 grs. |
| " saccharine matter, slightly acid - - | 64 " |
| " ligneous matter - - - - - - - - | 22 " |
| " green coloring matter - - - - - | 1 " |
| | 206 " |

leaving a loss of 394 grs., which was no doubt water, for the persimmons were very juicy. A portion of the saccharine matter was exposed to the air for a few days, when it became quite acid, and lost its sweetness in a great measure ; a solution was made, and sub-acetate of lead added: a precipitate was formed, which after standing for some time lost its amorphous character, and was converted into groups of crystalline needles; a solution of sulphate of iron changed the solution to a brown colour. These experiments indicated malic acid, which may have been derived from the sugar; which, if true, is an interesting metamorphosis, and deserves a more attentive examination than I have been able to give it at this time.

In the first of these experiments, we find the infusion of persimmons precipitated by solutions of sub-acetate of lead. sulphate of quinia, gelatin, and sulphuric and nitric acids Solution of sub-acetate of lead yields precipitates with almost all the organic acids, with gum, albumen, and caseous matter. Solution of sulphate of quinia causes a precipitate with tannin. Sulphuric acid forms a white sulphate. and nitric acid a dirty orange coloured nitrate of tannin. Sulphate of iron gives a purplish black colour to a solution

of tannin, such as is obtained from the oak bark. The precipitate with sub-acetate of lead, after standing for some time, changed its colour from white to orange, and then to dark brown, and this is particularly mentioned by Berzelius to be a property of the tannate of lead, and the certain test for this substance is the solution of gelatin, which is dissolved by most of the weak acids, but which precipitates tannin. The astringent matter of the persimmon is therefore inferred to be tannin, and tannin analogous to that of the oak bark, and not modified tannin, and it is also supposed that at this period of its growth tannin is the only active substance in the persimmon besides a trace of malic acid. The insoluble substance left after the evaporation of the tincture, is probably the apotheme which is formed when nearly all of the tinctures or infusions of vegetable astringents are exposed to the influence of the air; it agrees entirely in its properties with the description of apotheme which is given by Berzelius. There is neither starch, gum, nor resin, in the fruit.

(3.) A month after the last experiments a tincture was made of some freshly gathered persimmons; they were by this time about an inch in diameter; the colour was changing from a deep green to a light red; they were full of juice, very sweet, and excessively astringent. They contained all the substances found in those before experimented upon, but neither starch nor gum.

(4.) Some persimmons were gathered, as ripe as could be obtained, and after having been exposed to the frost, they were of a rich salmon colour, very sweet and juicy, and had entirely lost their astringency; 680 grs. of these persimmons were submitted to the action of alcohol; the tincture was filtered and evaporated; during the evaporation it did not become gelatinous, as in the former experiments, but thickened at once to a syrup, and was dried to the consistence of an extract; it was the same as the saccharine matter obtained before, analogous to grape sugar, and weighed

113 grains. The whole was completely soluble in water, and did not contain a trace of apotheme. The residue left when the tincture was filtered was now examined, and found to consist of ligneous matter, completely enveloped in a gelatinous mass; this was submitted to the action of a solution of caustic potassa; the liquor was immediately coloured deeply brown, almost black; after dissolving all the soluble matter, it was filtered and neutralized with nitric acid, which rendered the solution nearly colourless, and threw down a copious precipitate; this was dried, and weighed 18 grains. The remainder was ligneous matter, and when dry weighed 11 grains.

In all the former experiments there was found to be a considerable quantity of tannin in the persimmon; and when the tinctures were evaporated, the tannin, all of which had been dissolved by alcohol, was changed into an insoluble apotheme; but in the last experiment there was not a trace of tannin in the persimmon, nor yet of apotheme formed from the tinctures, but it was left with the lignin when the tincture was filtered; that this was apotheme, was inferred from the colour and general appearance, from the brown colour which it caused in a solution of caustic potassa, and from its precipitating, when the solution is neutralized by an acid, all of which are mentioned by Berzelius as being characteristics of apotheme. The apotheme from this experiment weighed 18 grains, which is nearly three per cent. on the persimmon employed. In a former experiment the apotheme was five per cent., so that the tannin is partially converted into sugar, but three-fifths of it is formed into apotheme and remains as such in the ripe fruit. There was also a considerable diminution in the quantity of lignin as compared with a former experiment, in which it was found to form one-twenty-seventh of the whole fruit; but in the last experiment it was only one-fifty-fourth. Now it is supposed that in the young fruit lignin serves as a sort of frame-work, and is a means of circulation for the juices of

the plant; but as the fruit ripens the lignin is converted into sugar, 20 parts of lignin producing 21 parts of sugar. The lignin which was missing in the last experiment would produce 13½ grains of sugar. In experiment fourth, the sugar was about one-fifth of the persimmon employed. In experiment third, it was rather more than one-ninth. Judging, then, from this experiment, one might suppose that in experiment fourth the sugar would be rather more than 82 grains, instead of which it weighed 113 grains; 13½ grains were produced from the lignin, making, when added to 82, 95 grains; the other 18 grains might have been formed from the two-fifths of tannin which was not formed into apotheme. The dried fruit strongly resembles the date in its taste, but an insoluble substance is very plainly perceived.

It seems to be a general opinion that a frost is necessary to perfect the fruit of the persimmon; the opinion, however, is not entirely correct; for in the West Indies the persimmon tree bears two crops, and both are ripened without the aid of frost, and I have in one instance seen the fruit perfectly ripe some days before any frost was felt. It is certain, however, that the cold has considerable influence in rendering them edible. An experiment was made in order to ascertain the cause of this. A tincture of kino was subjected to the action of the atmosphere on a cold frosty night; in the course of a few hours it was found to be almost entirely converted into an apotheme; but a portion of the tincture enclosed in a bottle and exposed to the cold, did not undergo any alteration in its character; so that it appears that the atmosphere, and not the temperature, effects this change. The persimmons which remain on the trees are not near so fine as those which fall to the ground, and indeed in many instances the fruit remains on the trees till the return of spring, and is then found to be quite astringent. It appears probable, then, that the cold acts by destroying the connection between the calyx and the stem

of the tree, and the fruit already mellow falls to the ground and is broken by its fall; the exposure of the pulp to the oxygen of the atmosphere for a few hours, would convert the tannin into an apotheme, and render the fruit edible.

From these experiments it might be concluded that when in a green state the persimmon contains little else than ligneous matter, tannin, sugar, a little malic acid and colouring matter, but neither gum, starch, resin, nor pectin. That as the fruit undergoes the process of ripening sugar increases in quantity, and both the juice of the fruit and malic acid are found more abundantly, but the tannin is decreasing. When the fruit has arrived at maturity the juices abound, lignin is in smaller quantity, and the tannin, instead of being converted into sugar, is in great part formed into an apotheme, and remains as such in the ripe fruit. The ripe fruit, if left to the action of the air, undergoes the acetous fermentation, and suffers decay.

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## ART. XXXI.—ON THE ETHEREAL EXTRACT OF CUBEBS.

By William Procter, Jr.

M. Soubeiran (Traité de Pharmacie, tom. ii. p. 48) gives a formula for making what is called "Oleo-resinous Extract of Cubebs," as suggested by M. Dublanc, and is as follows: Six pounds of Cubebs are directed to be distilled with twenty-four pints of water, the oil separated and set aside; the distilled water is returned to the still with six additional pounds of Cubebs, and again distilled, and the oil mixed with that of the preceding operation. The residue in the still is strongly expressed and then exhausted by alcohol of

36° Baumé, the alcohol removed from the tincture by distillation, and the residue evaporated to the consistency of honey; about twelve ounces of extract is thus obtained, which, when mixed with the volatile oil, is completed.

This is undoubtedly a good preparation, but the complexity of the process used in obtaining it is objectionable.

In the analysis of Cubebs by Monheim, he found the following ingredients in 1000 parts:

| | |
|---|---|
| Waxy matter, . . . | 30 parts. |
| Cubebin . . . . | 45 " |
| Green volatile oil . . . | 15 " |
| Yellow volatile oil . . | 10 " |
| Balsamic resin . . . | 15 " |
| Extractive . . . . | 60 " |
| Lignin . . . . . | 650 " |

In treating Cubebs by the process of Dublanc, the product contains all the cubebin and resin, most of the volatile oil, except that dissolved in the water, a part of the extractive and waxy matter; hence it is deficient in the most essential part, the volatile oil.

When pulverized Cubebs is treated directly by ether in a displacement filter until exhausted, and the ethereal tincture distilled carefully in a water-bath, the residue has a homogeneous consistence, about that of copaiba, a dark olive brown colour, transparent after the deposition of a small quantity of waxy matter, and possesses the odour, taste, and active properties of the drug in a marked degree. This substance consists of all the volatile oil, cubebin, and resin, most of the waxy matter, none of the extractive, and hence embraces all the active principles of the plant, to the exclusion, if we except the waxy matter, of those that are inactive. It is a true oleo-resin, and preserves its fluidity until the volatile oil is evaporated by a considerable temperature. Dr. Goddard, at whose request this ethereal extract was made, has found its therapeutical effects to fully answer his expectations, and feels assured that the drug is

faithfully represented by the preparation. For the guidance of those who may be inclined to make this oleo-resin for medical use, I subjoin a formula: Take Cubebs in powder one pound avoirdupois, and sulphuric ether a sufficient quantity, which is two and a half to three pounds; introduce the powder into a displacer, insert the lower end in a bottle that fits it, add the ether carefully, and cover the top of the filter with a piece of wet bladder, through which several pin holes are made. The flow should be very gradual, and if too rapid the orifice of the filter should be partially closed with a cork—by attention to this point much less ether will be required. The ethereal tincture should be introduced into a large retort, heated by a water-bath, and the receiver well refrigerated. The distillation should not be hurried towards the last. When five-sixths of the ether has passed, it should be separated for use, and the evaporation continued in the retort, observing to keep the temperature below 120° Fahr., so as not to volatilize the essential oil. The product in the retort amounts to two ounces, just one-eighth of the Cubebs used.

This preparation may be administered in emulsion, pills, or in capsules; one drachm representing an ounce of the Cubebs.

℞ Oleo-resinæ Cubebæ, . . . ℥ij.
Pulveris Acaciæ . . . ℥ss.
Sacchari, . . . . . ℥j.
Aquæ . . . . . ℥iiiss.
M. ft. emulsio.

A table spoonful of this emulsion represents two drachms of Cubebs. Should it be desirable to use alum with it, it may be dissolved in the water.

The most complete mode of administering this substance is in gelatin capsules, like those of copaiba, and it was in this form that Dr. Goddard employed it.

## ART. XXXII—IODIDE OF IRON OBTAINED BY DOUBLE DECOMPOSITION.

*Extracted from a Memoir on Iodide of Iron, by M. Ch. Calloud.*

By reducing iodide of potassium and sulphate of the protoxide of iron into fine powder, and triturating the mixture of the two salts, I have obtained proto-iodide of iron:

| | | |
|---|---|---|
| 1 equiv. | sulphate of the protoxide of iron | 139.1 |
| 1 " | iodide of potassium | 165.45 |

The mixture of the two salts, well pulverized, is triturated for a short time in an iron mortar; the double decomposition which is effected by the aid of the water of crystallization of the sulphate of iron, is known to be complete when the saline mixture has become humid; it is then treated by alcohol 36° Baumé, which dissolves only the proto-iodide of iron formed.

When the reaction is entirely effected, the sulphate of potassa is left in the condition of an insoluble salt, whence the following formula can be established:

$$(FeO,SO^3,7HO)+KI=KO,SO^3+FeI+7HO$$

*Analysis.*—The alcoholic solution of proto-iodide of iron by double decomposition is lightly greenish, has a styptic ferruginous taste, but not at all bitter or acrid. Diluted with water, it is not precipitated by nitrate of baryta. Exposed to the air, it behaves in the same manner as solutions of the proto-salts of iron, to wit: it becomes colored *yellow*, afterwards *brown*, forms an ochreous deposit of sesquioxide, or basic salt, at the same time that the presence of *free iodine* becomes evident.

Hydrate of potassa gives a precipitate of protoxide of iron, which being brought to the state of sesquioxide, corresponds with the proportion of iodide of iron produced.

Iodide of potassium, reconstituted from it, represents the quantity employed, except a slight loss.

These points well established, it is with much confidence that I propose the therapeutic employment of the proto-iodide of iron, mixed with sulphate of potassa. It presents the incontestible advantage of being found in a dry state without any alteration.

The following formula can serve for pharmaceutical preparations, having a base of iodide of iron:

| | |
|---|---|
| Sulphate of protoxide of iron, - - | 3 parts. |
| Iodide of potassium, - - - - | 4 " |

It is important to choose the sulphate of iron, in little almost colourless translucid crystals, which are constituted with seven equivalents of water of crystallization. The iodide of potassium ought also to be perfectly neutral and pure; the least alkalinity of the iodide will be discovered by the sulphate of iron, which in this case is a good test. For to be certain of the purity of the materials, the mixture of the two salts well pulverised, dissolved in a small quantity of water, ought not to be troubled by oxide of iron, either green or yellow, as the first indicates the basic character of the iodide of potassium, and the second that the sulphate of iron was partly sesquioxidised.

*Pills of Proto-iodide of Iron.*

| | | |
|---|---|---|
| ℞. | Crystallized sulphate of iron, - - | 24.7 grs. |
| | Iodide of potassium, - - - | 32.4 " |
| | Gum tragacanth, - - - - | 4.6 " |
| | Sugar, - - - - - - | 15.4 " |

Syrup and powder of marshmallow, q. s., for making 36 pills.

Each pill contains .8 of a grain of dry iodide, of iron, or 1.09 of the hydrated salt, and .4 grain of sulphate of potassa.

The sulphate of iron is at first reduced to very fine powder in an iron mortar, afterwards the iodide of potassium, and then triturate the mixture to facilitate the reaction of the

two salts; then add the gum, the sugar, the syrup, and, if necessary, the powder of marshmallow.*

To preserve these pills from the action of the air, it will be well to cover them with gelatin by the process of M. Garot. But this manipulation requires too much time to render it practicable for small quantities.

A mass which is readily preserved, is obtained by replacing the syrup and gum of the formula by 30 grains of crum of bread.

The water of the bread liquifies remarkably the sugar and salt, the powder of marshmallow is added to give the mass the necessary consistence. The gluten and soluble amidon of the bread form a varnish, which, by hardening, circumscribes the action of the air to the surface of each pill.

These pills are rolled in lycopodium and placed in a very dry place.

The following preparations can replace those described in the formularies:

*Tincture of Proto-iodide of Iron.*

| | | |
|---|---|---|
| R. | Sulphate of iron, - - - | 8 parts. |
| | Iodide of potassium, - - - | 10.5 " |
| | Alcohol 36° Baume, - - - | 160 " |

The two salts are triturated, as before described, the proto-iodide of iron dissolved by means of the alcohol, and filtered.

It is preserved in glass stoppered vials which should be exactly filled with the tincture. A slight excess of the iodide of potassium gives it more stability.

This tincture contains about one part of iodide of iron in 16 parts.

* A formula for pills of iodide of iron by our colleague, Henry W. Worthington, was published in vol. 15th, p. 71, of this journal, in which he evaporates a concentrated solution of the ferruginous iodide made by the process of the Pharmacopœia with honey and tragacanth to a pilular consistence. The honey preserves the iodide from oxidation during the evaporation, but renders the pills too deliquescent to keep in boxes.—W. P. Jr.

*Wine of Iodide of Iron.*

℞. Sulphate of iron, - - - 8 parts.
Iodide of potassium, - - - 10.5 "
White wine, - - - - 320. "

The two salts are pulverised, a few drops of wine added to the mixture to assist the reaction, triturate for a few moments, add the rest of the wine, and filter.

Thirty-two parts of this wine contain one of the ferruginous iodide, besides a little sulphate of potassa.

This wine should be kept in glass stopped vials, nearly filled, or in vials stopped with corks which have had their tannin saturated with proto-sulphate of iron, and washed.

The formula of Dr. Pierquin requires Bordeaux wine for the menstruum, but the tannin which exists in it in considerable proportion acts on the ferruginous salt, and I think it is preferable to substitute the white wine.

All the preparations having a base of iodide of iron obtained by double decomposition being very easily and quickly made, it is not necessary to prepare them in advance, but every time they are demanded on prescription.

Note.—The above method of M. Calloud, (extracted from his memoir in the *Journal de Pharmacie et de Chimie*,) for obtaining iodide of iron by double decomposition is particularly advantageous for its prescription in pills. The commercial iodide of iron almost always contains free iodine, and sometimes in such excess that its administration in pills would be highly irritating to the stomach, and altogether improper, and this is the case with iodide prepared very carefully, unless kept absolutely hermetically sealed. The sulphate of potassa is almost inert in the quantity resulting and may be looked upon as a means of giving consistence to the pills.

A syrup of iodide of iron may be made extemporaneously, perfectly free from free iodine, and containing the offici

nal quantity of dry iodide of iron by the following formula, viz:

| | |
|---|---|
| R. Proto-sulphate of iron, (pure,) - - | ʒiss. |
| Iodide of potassium, - - - - | ʒij |
| Water, - - - - - - | ℥ss. |
| Simple syrup, - - - - - | ℥iss. |

Rub the salts intimately together, dissolve them in the water, add the syrup, and bottle immediately. This preparation has a slightly greenish colour, and contains about 56 grs. of dry iodide of iron, and 27 grs. of sulphate of potassa. The great readiness with which this syrup is made, and the control the physician can exert over the strength of it, renders it in many respects an eligible formula.

W. P. jr.

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## ART. XXXIII—EXAMINATION OF PIPER ANGUSTIFOLIUM, OR MATICO.

By Thomas S. Wiegand.

At the suggestion of Dr. Ruschenberger of the U. S. Navy, who first called the attention of the Medical profession of this country to the article under consideration, the following experiments were undertaken, to learn what the composition of the plant is, and to ascertain whether the more active constituents might be separated and applied with more of advantage or convenience.

This plant has been the subject of several papers in the American Journal of Pharmacy, one of which states that it is valuable as a remedy in diseases of the genital organs and rectum, and that the natives use this plant for similar purposes: the last assertion is probably incorrect, for from information received by Dr. R. from Dr. J. H. Scrivener, who was practising medicine at Lima in April, 1845, it appears that, so far as could be learned from the druggists

there, no preparation of it was used internally, its employment being limited to the arrest of hæmorrhages and the treatment of ulcers.

His paper, which is short, is very much to my purpose, and containing, as it does, all the authentic information upon its commercial history and use among the Peruvians, needs no apology for its entire transfer.

"*Matico.* This plant grows abundantly along the sides of the mountains of Menobamba and Huanuco in the department of Junin.

"There are three species of this plant which are known by their stems, that are of a red, brown and white colour; the red species is considered superior to others, and, is brought to Lima in large quantities and sold to the druggists.

The discovery of the properties of this plant is assigned to a soldier, who, being attacked by a violent hæmorrhage from a a wound he received in the battle of Ayacucho, applied (for the want of other resources) the leaves of it to his wound, and found to his great astonishment that it immediately ceased.

"An account of this plant is to be found in the Flora Peruvianna, under the botanical name of Piperomia, which contains several species, but no mention whatever is made of its medicinal properties, probably unknown at that period.

"This plant is very generally used in Lima and along the coast in cases of hæmorrhages and all kinds of ulcers.

"The following is the formula observed there in hæmorrhages.

"The leaves are well pounded and then applied to the wound, which occasions a contraction of its vessels and consequently a cessation of the hæmorrhage.

"An infusion of this plant is used as a wash in ulcers, after which a small quantity of the powder is applied which produces a crop of healthy granulations.

"I am not aware that any preparation of it has been used internally; if such had been the case, I should have heard of

it from the druggists, of whom I have made particular inquiries.

"I have no doubt that a remedy possessing such important properties as the Matico in the case of hæmorrhages and ulcers might be administered internally with benefit in cutaneous diseases."

*Lima, April 30th*, 1845.

1st. A decoction of the leaves previously broken up was made, and to this Tinct. Iodine was added without producing any further change than that of adding its own colour to the decoction, thus showing the absence of starch.

2d. An infusion was made by displacing with water an ounce of the leaves, previously treated with æther to remove the matters soluble in that menstruum; to a portion of the infusion thus obtained liquor plumbi subacetatis was added, till a precipitate was no longer occasioned by it; the result was a copious flocculent precipitate, giving evidence of a considerable quantity of gummy matter.

3d. A quantity of the leaves previously broken up was placed in a copper still and covered with water; this was then boiled strongly, and the water, which at first came over clear, speedily assumed a milky appearance, and upon its surface streaks of a greasy aspect were seen—the water was returned to the still, and the oil, which came over, having subsided to the bottom of the recipient, was collected, the quantity obtained from 7 lbs. troy, was about 11 drachms; the most remarkable peculiarity of the oil is its great density. Its specific gravity being 1.12, its colour is a full yellow, and in quantity it has a slightly reddish tint, quite fluid, and of course possessed of the odour and warm taste of the leaves in a high degree; when placed on the tongue it causes a hot pungent taste, very persistent, as might be expected from one of this tribe of plants; it is freely soluble in alcohol and sulphuric æther; its odour is completely sui generis. When most of the experiments detailed in this paper had been finished, my attention was directed to some

observations on the Pharmaceutical and Chemical character of the Peruvian Matico, by John F. Hodges, M. D. He describes the oil to be of a light green colour, and, when freshly procured, of the consistence of good castor oil, becoming crystalline upon standing, and reddened by sulphuric acid.

Desiring to know whether the oil was at all soluble in water, a drop was placed in an ounce of distilled water and allowed to remain some days. When first examined, the oil seemed to be unaffected; it was left a few days longer, and examination showed an oil floating on the surface, whilst the drop still retained its globular form at the bottom of the glass. From this it was rather to be supposed that the oil first obtained was composed of two oils, one heavier and one lighter than water; to prove this the oil was distilled from a solution of potassa to remove the lighter oil, and it was successful, as the surface of the water in the recipient was covered with globules of a colourless oil; to the residue in the retort, sulphuric acid was added, and then subjected to distillation, when, on the surface of the water which came over, globules of the lighter oil were seen floating, and on the bottom of the receiver the heavy oil was to be seen.

4th. An æthereal tincture was made by displacing an ounce of the bruised leaves previously treated with alcohol, to remove the resin and volatile oil; the tincture thus obtained was evaporated, and the extract treated with potassa, washed, and then sulphuric acid was added, without any change of colour ensuing; whilst the tincture was evaporating, a film similar to that of fatty oil was perceptible; the extract had a very pungent taste.

5th. The alcoholic tincture, whilst evaporating, had less of a greasy appearance, and was not possessed of so pungent a taste; this, when evaporated and treated with potassa and washed, was unaffected in colour by sulphuric acid.

6th. A portion of the leaves, previously boiled in water, afterwards evaporated, was treated by acetic acid: the vine-

gar, thus formed, had some of the taste of the plant; and when evaporated to an extract, was treated with sulphuric acid, but no change in colour was perceptible.

7th. A portion of the leaves was incinerated in a crucible and treated with distilled water; after standing over night, and then boiled, the solution browned the turmeric paper very deeply, thus showing a strongly alkaline state. A portion of this solution was filtered into a glass vessel, and to it was added a solution of oxalate of ammonia, which caused a white cloud, and after a time a slight precipitate, thus showing the presence of lime.

8th. A quantity of the leaves previously broken up was put into a sand crucible, heated to redness, and when completely incinerated, the ashes were boiled in water acidulated with nitric acid. When cool, the liquid was filtered into a glass, and a few drops of the solution of ferrocyanuret of potassium were added, which gave the characteristic colour of Prussian blue—showing the presence of iron.

9th. Some of the ashes thus obtained were treated with distilled water and filtered, the solution was then concentrated by boiling, and to the liquor a saturated solution of tartaric acid was added, which after a time produced a crystalline deposit, showing the presence of potassa, and thus confirming the result of Dr. Hodges.

The results of the analysis of Dr. Hodges were as follows:

Chlorophylle soft, dark green resin, brown colouring matter, yellow ditto, gum, nitrate of potassa, bitter principle, maticin, aromatic volatile oil and salts.

The oil is composed of two, one heavier and one lighter than water, and the salts are those of iron, lime and potassa.

It thus appears that there is no principle in matico analogous to piperin, as the crystals mentioned by the author above quoted were left undissolved by the alcohol with which they were treated, and when dissolved in water their base was proven to be potassa, as the chloride of platinum threw down a yellow precipitate.

If the efficiency of this plant depends upon the essential oil, as is thought by Dr. Hodges, how can it be supposed that a cold infusion is the best form of exhibition? Can an aqueous menstruum remove the oil from the leaves and hold it in suspension? To determine whether the oil was removed from the leaves by cold infusion, a portion of the leaves were displaced with distilled water after a maceration of three hours, and introduced into a small glass retort; they were then strongly boiled; the distillate was the same in every apparent property, as that from leaves not previously infused. How this agrees with his opinion that the cold infusion seems the best form for obtaining its medicinal properties, and that the oil is probably the most important principle, is not readily perceived.

*U. S. Naval Hospital, New York, August* 4, 1846.

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## ART. XXXIV.—ON THE EMPLOYMENT OF MAGNESIA IN THE TREATMENT OF POISONING BY ARSENIOUS ACID.

By A. Bussy.

The results of my investigations are,—

1. That purified animal charcoal, recently proposed as an antidote in cases of poisoning with arsenic, cannot be employed with success for this purpose.

2. That pure but slightly calcined magnesia readily absorbs arsenious acid in solution, and forms with it a compound insoluble even in boiling water.

3. That, in the gelatinous state, it absorbs it still more rapidly.

4. That animals to which arsenic had been administered were constantly saved when sufficient doses of magnesia were subsequently given to them.

5. That this antidote has an advantage over all those

hitherto employed, of being always on sale at every chemist's shop, that it readily and entirely neutralizes the poison, that a large amount may be administered without inconvenience, and that its general therapeutic effects are of themselves in relation with the indications to be fulfilled in such cases of poisoning.

6. That magnesia decomposes tartar emetic, salts of copper, and corrosive sublimate; and there is reason to believe that it might be employed with success in combating and mitigating the effects of those poisonous substances, and that of metallic salts in general.

7. That the salts of the organic alkalies, morphine, strychnine, &c., being equally decomposed by magnesia, the use of this substance in cases of poisoning by organic products, whose action is owing to the presence of some vegetable alkaloid, might retard and render the absorption of the poison more difficult. This, however, I intend to confirm by subsequent experiments.—*Chem. Gazette, from Comptes Rendus.*

Note.—The observations of M. Bussy, with reference to the use of magnesia as an antidote for several metallic poisons, are of the very first importance, should they prove to be substantiated in practice. So far as arsenious acid is concerned, I have tried several careful experiments, and have arrived at the conclusion that magnesia, like peroxide of iron, is only suitable as an antidote when it is in a hydrated gelatinous condition. A solution containing one grain and a half of arsenious acid was mixed with 30 grains of commercial calcined magnesia, of ascertained good quality, and frequently agitated. After several days the filtered solution yielded abundant green and yellow precipitates with the ammonio-sulphate of copper and the ammonio-nitrate of silver. The same quantity of Henry's or Husband's magnesia was then tried without removing the poison in 24 hours, (after which period it was not tested.) The quantity of magnesia was then increased to 80 grains, which, after a period of an hour or two, had precipitated the arsenic. When, however,

magnesia, as a gelatinous hydrate, thrown down from epsom salts by caustic soda or potassa, and well washed, is employed, the poisonous acid is removed from the solution in a comparatively short time; but not near so quickly as by hydrated sesquioxide of iron—which I believe to be a more eligible antidote, and quite as quickly prepared, being more easily washed than the magnesia.

It would be inferred, *à priori*, as the arsenite of magnesia is an insoluble salt, that sulphate of magnesia would be a perfect antidote for arsenite of potassa, but on adding a solution of epsom salts to Fowler's arsenical solution the mixture remains transparent!

The importance of M. Bussy's conclusions to toxicological knowledge, deserve a more extended examination than I have been able at this time to give them.—W. P., jr.

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## ART. XXXV.—ON AMORPHOUS QUININE AS IT EXISTS IN THE SUBSTANCE KNOWN IN COMMERCE AS QUINOIDINE.

By Baron Liebig.

The following excellent paper appeared in The Lancet of the 23d May :—

In the preparation of sulphate of quinine, after all the crystals which can be obtained are separated, a dark-coloured mother-liquor remains, having an extremely bitter taste. On the addition of an alkaline carbonate, this liquid loses its colour and bitter taste, depositing at the same time, a yellowish-white, or brownish precipitate, which, after

being rinsed with water, and exposed to a gentle heat, agglutinates into a coherent mass, exhibiting the appearance of resin.

From the experiments of Sertuerner, Thiele, Bucholz, junior, Koch, and other chemists, it has been long known that this resinous substance possesses the properties of a base, that it neutralizes acids perfectly ; but the salts which are formed by these combinations with acids, have baffled all attempts at crystallization.

Sertuerner, who was the first chemist to separate this resinous substance from the mother-liquor of sulphate of quinine, considered it to be a distinct and peculiar organic base, existing in yellow and red cinchona barks, associated with quinine and cinchonine. He assigned to this, as he supposed, new substance, the name quinoidine, and greatly extolled its medicinal efficacy, in which he declared it was in all respects equal to quinine. In his journal (*Uber die neuester Furtschritte in der Chemie, Physik und Heilkunde,* Bd. iii., No. 2, page 269,) he terms it "a true fever-destroyer."

Subsequently, this substance, under the term quinoidine, has been employed medicinally in many places, and even introduced into the lists of commercial articles or price currents of many of the druggists of Germany.

In certain mother-liquors of quinine left in the preparation of the sulphate, which were analysed by Henry and Delondre, and also a sample of quinoidine examined by Geiger, these able chemists discovered an amount of quinine and cinchonine, accompanied by a resinous substance which they considered impeded the crystallization of the sulphates of the two bases, and which in their experiments they failed to separate. The results obtained by these chemists, and the inferences obviously deducible from these results, rendered it indubitable that the medicinal efficacy of quinoidine must vary according to the greater or less proportion of quinine it may happen to contain. Now, there

cannot be a doubt but that this uncertainty with respect to the relative amount of quinine in commercial quinoidine has prevented many physicians from prescribing the latter as a remedy, notwithstanding the testimony borne to its efficacy.

Having occasion, some time since, to pass through Coblentz, I procured from Messrs. Jobst & Co., of that town, a sample of quinoidine, for the purpose of employing it for the preparation of quinoleine—a substance discovered by Gerhardt to result from the transformation of quinine, and to which much scientific interest attaches, in consequence of the recent discovery of Professor A. W. Hofmann, that quinoleine is identical with leucol, a body which is one of the components of the essential oil of tar, prepared from anthracite coal. It then occurred to me, that if the sample of quinoidine which I had procured, contained quinine, it must yield a corresponding amount of quinoleine, and that, consequently, a very simple method of testing quinoidine for the amount of quinine it may contain, might be based upon this property of quinine to be transformed into quinoleine.

On subjecting the sample I had obtained (which amounted to several ounces) to distillation with strong potass ley, I confess I was surprised at the large amount of quinoleine produced, which proved the presence of a far larger proportion of quinine than could have been anticipated. This unexpected result induced me to subject quinoidine to a stricter examination ; and in order to avoid being misled by accidental circumstances, I procured, beside the Coblentz sample, specimens from Messrs. Hess, Leissler, and Fiedler, of Mayence, and from Messrs. Mettenheimer and Simon, at Frankfort, and also from a druggist at Hamburgh.

These various samples of quinoidine I received partly in irregularly shaped masses, and partly as square cakes of a darker or lighter brown colour, which, by the warmth of the hand, became soft and flexible, but were readily pul-

verizable in the cold. The operation of powdering imparted to it an extraordinary degree of elasticity. All these samples were completely insoluble in cold water, but scantily soluble in hot water, imparting to the latter a strongly bitter taste. I may here, however, observe, in passing, that some commercial specimens which I have since seen are soluble in cold water, arising from a considerable admixture of other substances; differing, also, from the same cause, in many of the following properties:—

All the first samples I speak of dissolved in alcohol, in the proportion of one part to two of the menstruum; and from this alcoholic solution, water precipitates copious, yellowish-white, resinous flakes, which cohere into a mass like the original quinoidine. Dilute mineral acids, as well as most of the organic acids, dissolved my samples entirely, and by adding a sufficient amount of the substance, became completely neutralised. From these solutions in acids, ammonia and alkaline carbonates precipitated resinous flakes. On agitating the fluid containing these flakes and the flocculent precipitate, with an equal volume of ether, the precipitate dissolves in the ether, *with the exception of a dark-brown residue.* On evaporating the ether, a resinous mass is obtained, having all the properties of an organic alkaloid.

Its salts are precipitated by tannic acid. Chloride of platinum produces, in its solution in hydrochloric acid, a yellow precipitate. Moreover, it dissolves completely in a solution of sulphate of copper, with the separation of oxide of copper. Now there exists no resin, nor, indeed, any other substance similar to resin, which possesses this peculiar property.

These observations can leave no doubt whatever as to the chemical character of a considerable proportion of the residue to which the term quinoidine has been applied—namely, that it is a true organic base.

On subjecting the purified substance to elementary analysis, the following were the results:—

I. From the quinoidine of Mayence, 0.490 grammes yielded 1.3204 grammes of carbonic acid, and 0.3395 grammes of water.

II. From the quinoidine of Frankfort, 0.618 grammes yielded 1.6575 grammes of carbonic acid, and 0.4250 grammes of water.

III. From the quinoidine of Coblentz, 0.3475 grammes yielded 0.9475 grammes of carbonic acid, and 0.2375 grammes of water.

According to these analyses, this substance contains—

| | I. | II. | III. |
|---|---|---|---|
| Carbon | 73.49 | 73.14 | 74.33* |
| Hydrogen | 7.69 | 7.64 | 7.57 |

The determination of the nitrogen, by the method of Verrentrapp and Will, yielded the following results :—

0.515 afforded 0.289 of platinum.
0.617 " 0.401 "

And, consequently, the substance under examination contains, according to the first analysis, 8.04 of nitrogen ; according to the second, 9.54 of nitrogen—the medium of the two analyses giving us as its amount of nitrogen, 8.79.

*Analyses of the Chloride of Platinum and the base from Quinoidine, (Amorphous Quinine.)*

I. 0.6663 grammes of the double salt yielded 0.1755 of platinum ; 0.8700 grammes of the double salt yielded 1.349 carbonic acid, and 0.303 of water.

II. 0.881 grammes of double salt yielded 0.224 of platinum.

III. 1.0668 grammes of double salt yielded 0.2715 of platinum.

From these analyses, therefore, the following are the proportions of carbon, hydrogen, and platinum, which exist in 100 parts of the chloride of platinum, and the substance derived from quinoidine :—

* Carbon=75, according to Prout and Dumas.

| | I. | II. | III. |
|---|---|---|---|
| Carbon | 32.44 | | |
| Hydrogen | 3.86 | | |
| Platinum | 26.33 | 26.32 | 26.45 |

Now, if we compare the proportion of carbon, hydrogen, and platinum, existing in the chloride of platinum and this base, derived from quinoidine, with the amount of the same elements present in the corresponding chloride of platinum and quinine; and, further, the amount of carbon, hydrogen, and nitrogen, contained in the substance under examination, with the proportion of the same elements as they exist in quinine; we perceive at once that the two substances have identically the same composition.

Quinine, according to the formula—

$$C^{20}\,H^{12}\,NO^{2},$$

contains—

Carbon, 74.33; hydrogen, 7.75; nitrogen, 8.62.

Chloride of platinum and quinine, according to the formula—

$$Cl\,H\,C^{20}\,H^{12}\,NO^{2}+Cl\,Pt,$$

contains—

Carbon, 32.38; hydrogen, 3.53; platinum, 26.83.

The inference from these experiments, then, is irresistible: the uncrystalline substance derived from quinoidine bears exactly the same relation to ordinary quinine that uncrystalline sugar (barley-sugar) bears to crystalline (sugar-candy.) Both yield the same atomic weight, and identically the same composition; they differ only in form: in one word, one is crystalline, the other *amorphous*.

I deem this to be an important discovery, when we consider the high price of quinine, the possibility of a check to the supply of cinchona bark from the countries producing it, and the amount of the crude quinoidine which has accumulated since the manufacture of sulphate of quinine was commenced. Quinine, indeed, seems to be absolutely indispensable for the treatment of diseases; the progress of

civilization in modern times has depended, far more than has been conceived, upon the discovery of a remedy for the fevers which prevailed where tillage is imperfect, and in new and unbroken soils.

This chemical investigation has thrown an interesting light upon the testimonies borne to the efficacy of quinoidine in the treatment of fever, and the highest encomiums have been passed upon it; but the commercial specimens have differed very much in value; while some have consisted nearly altogether of amorphous quinine, others have contained only a small per centage.

It is necessary that the amorphous quinine should be separated from all admixtures and impurities, and prescribed in its pure state. There can be no doubt but the same substance will produce the same effect on the animal organism, whether exhibited in a crystalline or an amorphous state. The system, as we may say, makes no difference in such a case. As I have already observed, the mystery about quinoidine is completely solved by the discovery, that it usually contains a very large per centage of pure quinine in an amorphous state.

In a commercial point of view, it is certainly a matter of great importance that we should be able to judge by the mere external appearance of a remedy, of its purity; and, consequently, how far we may rely upon its efficacy. This is thought to be the case with the crystalline sulphate of quinine, whilst the non-crystalline form of quinoidine has probably led to a disregard of the evidence for its usefulness, even more than the fact of its being, as usually sold, an admixture of various substances. But with respect to the mere amorphous form, when the quinine is separated from all its adhering impurities, it is in the same case with opium, castor, and many more of the most efficient remedies which we possess, particularly with the extracts of our pharmacopœias. It is necessary to be assured of their purity before we employ them, but their amorphous form does not

prevent their use. In many of these cases, indeed, having no direct or ready way of testing them, we rely solely upon the honorable character of the merchant and dealer; but we have a completely satisfactory test for the purity of amorphous quinine. Few medicinal agents afford so ready a means of distinguishing them, and detecting admixtures, as the organic alkaloids: but if these tests are not employed, it is as easy to be deceived in purchasing crystalline sulphate of quinine, as the amorphous.

Amorphous quinine is completely soluble in dilute sulphuric acid, and in alcohol, as I have said above; it is also completely soluble in a solution of sulphate of copper, with separation of oxide of copper. And if its solution in a dilute acid yields, upon precipitation by means of ammonia, exactly the same amount of precipitate as the weight of the substance originally dissolved in the acid, there can be no doubt remaining as to the perfect purity of the sample under examination.

It only remains for me to observe, that no dependence should be placed upon the ordinary quiniodine of commerce. As I have already stated, some samples which I have seen, dissolve incompletely in water, forming a dark-brown muddy fluid; these have been probably produced by simply evaporating the mother-liquors of sulphate of quinine to dryness They are, therefore, uncertain mixtures of various substances with sulphate of amorphous quinine, with or without excess of acid, so that in purchasing such specimens, the buyer is paying the price of an organic alkaloid for sulphuric acid, &c. The pure amorphous quinine should be separated, and it would then form a most valuable remedial agent; but the prescriber must be assured of its purity, and the test I have given will suffice for this purpose.—*Chemist.*

## ART. XXXVI.—AMORPHOUS QUININE.

By. Dr. Natorrs.

You tell me that you are desirous to know whether I continue to employ the uncrystalline alkaloid of the cinchona bark, and what are the results of my experience respecting the therapeutic effects of this remedy. In answer to your inquiries, I am happy to communicate the following effects :

The late Mr. Reidel, pharmaceutical chemist, was largely engaged in the manufacture of the various preparations of cinchona bark, and he obtained an uncrystallisable residue, incapable of further purification. Thinking that this substance might be employed as a remedy, he furnished me with a considerable quantity, for the purpose of making experiments in my practice among the poor peasantry. It happened that just at that time an epidemic intermittent fever was raging in Berlin and the neighborhood, which gave me a most favorable opportunity of testing its anti-intermittent power ; and I was quite astonished at the extraordinary effect of this new substance. Another physician, Dr. Skilling, physician to the forces, made at the same time similar experiments with it, and obtained the same results. As the fever was excessively prevalent in the villages around Berlin, many of the proprietors to whom I am physician applied to me to furnish them with a remedy against the disease. I prescribed the new substance in question, in solution, as I will presently explain ; and the result was, the rapid disappearance of the malady from their estates. The reputation of these cures at that time extended so far, that the peasants came from forty-five to fifty miles' distant to fetch 'the fever-drops.' One proprietor of a large estate near Warsaw, hearing that an epidemic fever had broken out amongst his peasantry, forwarded large quantities of the fever-drops, and he was soon gratified with the

intelligence that the use of this remarkable remedy had been attended with immediate success.

I now employ this substance only, to the exclusion of all other preparations from bark, quinine, &c., in all cases of intermittent fever; and I can boldly assert, that in the experience of many years it has never disappointed me. It has this great and inestimable advantage, that one can determine with absolute certainty, by administering it, that the recurrence of the attack shall be prevented. No other preparation of bark, and no other remedy that I know of, will enable us to say with positive certainty that the next expected accession shall not take place. Moreover, it prevents the occurrence of relapses, more than any other febrifuge; and in many thousands of cases in which I have had occasion to employ it, I have never seen the cessation of the fever followed by unpleasant sequelæ. My way of prescribing this remedy is in a spirituous solution, of which I mix one ounce, with acid of Haller, a drachm; peppermint-water, three ounces. Of these drops, I give in quotidian fever a teaspoonful ever hour from the commencement of the perspiration; in tertian, one every two hours; in quartan, one every three hours.

When the attacks have ceased, which I feel almost inclined to assert is uniformly the result of the administration of this remedy, I always give a teaspoonful of the above mixture every night and morning, until there is no longer any fear of a relapse.

I have also experienced the efficacy of this remedy in fevers of a sporadic origin; and I and many physicians of Berlin employ it as a tonic in all cases where we used to prescribe any of the other forms of bark.

I will not presume to pronounce on the chemical nature of this uncrystalline body. I suspect that 'chinoroth' plays an important part in it.

Should you deem any further or more minute information respecting this matter desirable, I shall be happy to supply

you with all I know. You are at liberty to publish or make what use you think proper of this communication.

I may add, that this substance will be introduced into the next edition of the "Prussian Pharmacopœia."—*London Lancet.*

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## ART. XXXVII.—NEW APPARATUS FOR EXTRACTING THE COLOURING FROM DYE WOODS.

By M. Iwan Schlumberger.

At a meeting of your committee of chemistry I communicated the advantages which I had found in the apparatus of Mr. Meissonnier, for extracting the colouring matter of log-wood. Some members appearing to doubt the real merit of this apparatus, from not having produced results analogous to mine, on trying it, I made some fresh experiments, which I explained to your committee of chemistry, accompanied by calculations which any other person might make.

It is of some of these experiments I am now about to speak.

In order to make decoctions of logwood, the usual method is, to put a quantity of shavings of that wood into a boiler in immediate contact with the fire, together with a quantity of water, sufficient to cover the wood completely, so that after boiling for some hours the wood may be quite covered. The operation is renewed twice with the same liquor, and after three successful boilings, the decoctions are mixed together and evaporated to the degree required.

This operation is attended with several disadvantages. Shavings only can be employed, for if the logwood be re-

duced to powder, it absorbs so much water that a great quantity of liquid is lost, and the shavings being rather thick, the water cannot readily penetrate, for which reason the time of boiling is very much prolonged.

Notwithstanding these three long boilings, if the same wood be boiled a fourth time, a liquid pretty well coloured is obtained; which clearly shows that all the coloring matter has not been extracted.

Besides this, when decoctions of logwood are required in large quantities, very large vessels and extensive premises are necessary, as well as several furnaces, in order to produce a sufficient quantity: for the wood, when in shavings, is very bulky without being heavy, and large boilers are required for making a decoction from 50 lbs. of shavings, with the necessary quantity of water. Several boilers must, therefore, be employed, otherwise the fire must be kept up day and night.

I will here describe, *en passant*, for the benefit of those persons who have not many furnaces, but who have a steam-pipe at command, a method which I have employed for some time to make decoctions in great quantities, and which, I think, I can recommend in this instance.

A large high narrow vat, capable of containing about from 100 to 150 lbs. of wood shavings, is mounted upon a stand or framing, and furnished with a cock below, in order to draw off the liquor. At a short distance above the cock, inside the vat, a false bottom or diaphragm, pierced with holes very close to each other, is fixed, in order to leave a space at the bottom to prevent the wood from clogging up the cock, and stopping the flow of the liquor. A steam-pipe, about one-third o fan inch in diameter, is carried to the bottom of the vat, which is filled with shavings. It is covered with a cloth and a cover, which is weighed, in order to prevent the steam from issuing out in too great abundance. The shavings must not be heaped up more than in the common boilers. In this state, steam is allowed to flow in for

an hour at least, until it escapes out in moderate quantities at the top. During this time the wood swells and becomes penetrated by the steam; then, when the vat is filled with water, it will be sufficient to heat to the boiling point, in order to obtain, the first time, a strong decoction. The vat is afterwards filled twice in succession, and made to boil as usual; and in the same space of time, with less labour, a much larger quantity of decoction is obtained, and much more colouring matter extracted.

By the two methods just mentioned, considerable time is required for each operation, and the wood is not entirely exhausted of colouring matter; but with M. Meissonnier's apparatus much more advantageous results are attained.

This improved apparatus consists of a copper boiler of about a foot and a half in width, and about two feet in depth. At a short distance from the bottom of the boiler is a false bottom, pierced with a multitude of holes, which sustains the wood in the water, and leaves an empty space for the boiling liquor. Into the boiler powdered wood is thrown, and it is covered first, with strong wire-work, and then with a copper-plate pierced with small holes, which cover is held firmly down upon the edges of the boiler by any suitable means. At the side of the boiler is a small lift and force pump, simply constructed, which draws the boiling water from any suitable vessel and forces it through a pipe into the empty space at the bottom of the boiler. The water afer passing through the wood and the pierced cover of the boiler, is run off into any suitable receiver.

In our manufactory, at the side of the pump, is a boiler, heated with a coal fire, capable of containing 450 quarts of water, which is to be boiled for each operation. After filling it, and lighting the fire, the other boiler is filled with powdered logwood, spread as evenly as possible, until it contains from 84 to 90 pounds of wood. The water having arrived at the boiling point is then forced into the space at the bottom of the vessel containing the dyewood,

and driven up through the wood. In this manner, in two hours, the 450 quarts pass through and extract all the colouring matter from the dyewood.

The liquor which has passed through the wood is divided into three distinct portions, in this manner: a first portion of the decoction may be $3\frac{1}{2}°$ Beaumé; a second, $1\frac{1}{2}°$; a third, $\frac{1}{2}°$; and lastly, a fourth portion of liquid very slightly coloured, which may be mixed with the water for the next operation. In this manner the most advantageous results are secured, as three decoctions of different degrees of strength are obtained at one working, without evaporation.

When a second operation is not commenced immediately, the waste heat of the furnace is employed to concentrate the liquor.

I will compare the advantage of this apparatus with that which we were obliged previously to use.

This, in a boiler heated by fire, 140 pounds of shavings and 80 quarts of water were put, and the liquor was boiled for four hours: this was renewed three times. For 40 pounds of logwood, it was, therefore, necessary to boil 240 quarts of water for twelve hours. I double these quantities the better to compare them with those produced by the new apparatus. Thus, by the old method, for 80 pounds of wood it was necessary to boil 480 quarts of water during twenty-four hours.

By the novel method, when from 84 to 90 pounds of wood are operated upon, two hours are necessary for heating the 450 quarts of water, and two hours for pumping it through the wood. Therefore, for 84 pounds of wood, it will be necessary to heat 450 quarts of water for four hours, effecting an economy of fuel for twenty hours' consumption.

Besides this, the colouring matter is better extracted, and a great economy of labour is effected, as one man can effect two operations per diem.

Several precautions are necessary, in fact indispensable, to ensure complete success; for instance, the wood must be

very evenly spread, in order that the resistance offered to the water may be equal throughout; and, for this purpose, the wood must be put into the vessel in small quantities at a time. A very important point is, to have the wood ground or rasped of a uniform size, without fine dust, as the particles of this latter are apt to adhere together, and offer great resistance to the water at certain parts; thus preventing the colouring matter from being extracted therefrom. I have found that the wood spreads much better by previously wetting it.

For some other woods, such as Lima and Pernamcubo woods, and other red dyewoods, 600 quarts of water, instead of 450, must be employed, as the colouring matter is not so easily extracted. Quercitron cannot be operated upon as it is too fine a powder. Cochineal does not succeed, as it swells so much on coming in contact with boiling water, that, in an experiment I made, I thought it would have burst the boiler.

This apparatus is, however, very advantageous for the woods above mentioned, if the directions given are carefully followed.—*Chemist, from Newton's London Journal.*

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## ART. XXXVIII.—ON THE QUANTITATIVE ESTIMATION OF BROMINE IN MINERAL WATERS.

By M. Heine.

[This process is described in a work bearing the title, "Chemical Investigation of the Brines, Salts and residues of the Graduation Works in Saxony and Westphalia." Hitherto we possessed no accurate quantitative method for the determination of this important substance in mineral

waters. Although the process of M. Heine cannot lay claim to the most perfect accuracy, we have no doubt it will be found preferable to any other method now in use.]

The usual qualitative test for bromine, consists in mixing the solution supposed to contain the bromides with some æther, then carefully adding chlorine water and leaving the fluid in quiet; the æther collects on the surface. It is colourless when no bromine is present, faintly yellow when there is little, slightly or strongly brown when in greater quantity. To make use of this test in quantitative investigations, several precautions must be taken. In the first place, it had to be ascertained whether the mother-leys, which are sometimes of a yellow colour, would impart this colour to the æther; experiments proved this not to be the case. On adding chlorine water to the leys, they were more or less decolourized, a proof that the yellow colour was owing to organic substances. It is further known that æther assumes a faint yellow tint when it is shaken with chlorine water; it became requisite to know whether a small quantity of chlorine water is capable of producing this colouration, or only large quantities. A considerable amount of chlorine water was employed, before its influence on the colour of the æther became perceptible. In order to conclude with probability as to the quantity of bromine, so much chlorine water had to be employed that all the bromine was set free and taken up by the æther. It was therefore requisite to determine this quantity, by the addition of more or less chlorine water to liquids containing the same amount of bromine, and by comparing the tints of the æther*. The volatility of the æther and the bromine had also to be considered, and the glasses had to be made so that they could be closed tight and very quickly, and at the same time be almost entirely filled. And lastly, it was requisite to use equal quantities of æther, &c., for all the

*It is necessary to use the strongest possible chlorine water recently prepared.

experiments, and equally coloured, or rather colourless glasses of the same size, that the layer of ether might be of the same height and breadth.

In the next place, a series of liquids containing a known amount of bromine, was prepared by dissolving in every 25 grms. of distilled water, from 5 to 50 milligrms. of bromine. In this way I formed a series of equally large test-tubes of white glass, which contained in the same quantity of water (25 grms), 5, 10, 15, 20, 25, 30, 35, 40, 45 and 50 milligrms. of bromide of potassium. Equal quantities of ether, measured in the same glass, were added to these solutions, and the tubes immediately closed

The same vessel which served to measure the ether, answered also for the chlorine water, it having been previously found by experiment, that more chlorine water did not render the ether of the solution containing most bromine darker. The addition of the chlorine water to the test-glasses, was likewise effected as quickly as possible. They were then well shaken; the ether soon collected on the surface, and a beautiful, extremely regular scale of colours from yellow to brown was obtained—a proof that that the solutions might serve as standards for comparison. Beyond 50 the comparison becomes more uncertain, because the tints of every additional 5 milligrms. of bromide of potassium can no longer be well-distinguished on account of the dark colour. It is however evident that 5 milligrms. bromide of potassium = 3.3 milligrms. bromine, dissolved in 25 grms. water, diluted therefore 7600 times, exhibit a remarkable reaction, and that the limit of sensibility is far greater, certainly beyond 20,000 times dilution.

As soon as the scale of colours had been prepared, the glasses filled with mother-ley and ether, which were perfectly similar in size and had been previously arranged, were shaken with chlorine water, and the tints produced compared with those of the test-glasses. Each glass contained equal volumes of the ley from the different salt-works,

measured in a vessel capable of containing 25 grms. of water; and the same quantities of ether and chlorine water were added to them as to to the test-liquid. The operation requires to be made with great haste, because after some time the colour of the ether decreases, and entirely disappears in the course of 12 to 16 hours.

The following are the results of several experiments :—

| No. | Spec. grav. | Mother-ley. Grms. | Salt-works. | Corresponded to a test-liquor containing bromide of potassium. Milligrms. | The ley consequently contains: Bromide potassium In 100 parts. | The ley consequently contains: Bromine In 100 parts. |
|---|---|---|---|---|---|---|
| 1. | 1.255 | 31.375 | Halle | 41 | 0.131 | 0.087 |
| 2. | 1.270 | 31.750 | Kösen | 36 | 0.113 | 0.075 |
| 3. | 1.315 | 32.875 | .. | 35* | 0.107 | 0.071 |
| 4. | 1.303 | 32.575 | Artern | 32 | 0.098 | 0.065 |
| 5. | 1.250 | 31.250 | Schönebeck | 29 | 0.093 | 0.062 |
| 6. | 1.273 | 31.825 | .. | 33 | 0.104 | 0.069 |

In such cases as the above, in which the amount of bromine is by no means considerable, the method proposed for ascertaining its amount by means of a scale of colours appears to me more certain than the analytical determination from the mixture of chloride and bromide of silver according to Rose. The numbers obtained for the bromine should properly be subtracted from the amounts of chlorine; but they are not sufficiently large to render a re-calculation of the results of the analysis of the leys necessary.

Quite as accurately, if not more so, may iodine be estimated in liquids by the well known method with solution of starch and nitric acid. A large amount of chlorine (which is the case in the brines and leys from salt works) is, it is true, a hindrance; I have however convinced myself, by the addition of $\frac{1}{300}$ iodide of potassium, that the

*This sample on shaking, yielded a froth which floated in the layer of ether, and somewhat prevented the comparison of the colour; however, the error cannot be very considerable.

reaction with starch and sulphuric acid is still perceptible. I only obtained distinct evidence of iodine in the mother-leys from the salt works of Halle ; in all the others none, or so very slight, that the presene of iodine cannot be asserted positively.—*Chem. Gaz. from Journ. für Prakt. Chem.*

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## ART. XXXIX.—ON AN ADVANTAGEOUS METHOD OF PREPARING CHROMIC ACID, AND ON A PECULIAR BEHAVIOUR OF THIS ACID TOWARDS SULPHURIC ACID.

By Dr. P. A. Bolley.

The process described by Fritzsche for preparing chromic acid from a hot solution of the bichromate of potash by means of sulphuric acid, is decidedly preferable to every other on account of the large produce. Warington and Böttger have modified this process, because the product obtained according to Fritzsche's method is not pure, but always contains some sulphate of potash ; they recommend mixing a cold saturated solution of the bichromate of potash with 1 or 1½ parts of monohydrated sulphuric acid.

The proportion of the sulphuric acid to the bichromate of potash is not stated by Fritzsche ; the amount of acid prescribed by Warington and Böttger is so remarkably great and renders the product so dear, that it is worth while endeavouring to find a process requiring less sulphuric acid.

When 12 to 15 parts by measure of sulphuric acid are prescribed for 10 parts of the solution of the salt saturated at the ordinary temperature, this large amount has certainly some other part to act than the decomposition of the salt, viz. the precipitation of the eliminated chromic acid from its aqueous solution. I endeavoured to separate the

two effects, and from the peculiar property which will subsequently be described, I adopted the following process as the best:

A boiling saturated solution of the bichromate of potash is formed, and during ebullition a weighed quantity of sulphuric acid added to it sufficient to form with the potash bisulphate. The mixture is allowed to cool, when it solidifies for the greater part to a granular red mass. This is not chromic acid, but sulphate of potash, with adherent chromic acid, together with which is formed a concentrated solution of chromic acid, which likewise contains some sulphate of potash. The mass is stirred with a rod to cause the granular part to subside, and the liquid portion decanted. The residuous mass is agitated with several small quantities of cold water, and what dissolves poured off. In this way there is at last contained in the dish an orange-coloured sulphate of potash with very little chromic acid. Most of the chromic acid is contained in the united solution.

This process depends on the circumstance, that bisulphate of potash, which is very soluble at a boiling temperature (1 part in $\frac{1}{2}$ water,) is dissolved with difficulty at the ordinary temperature, and that cold water mostly removes from it sulphuric acid with scarcely any potash, leaving behind neutral sulphate of potash, while the chromic acid is extremely soluble in the cold water. The concentrated solution of the chromic acid, containing a little sulphate of potash and sulphuric acid, may now be somewhat evaporated, and the chromic acid precipitated from it by the addition of sulphuric acid, without any perceptible traces of the sulphate of potash being thrown down with it; for this salt is readily soluble in the monohydrated sulphuric acid, and still more readily in acid more diluted. The chromic acid is separated from the liquid by draining on a funnel, the neck of which is loosely stopped with fragments of glass, and then dried on porous tiles; by re-solution in water and slow evaporation, it may be obtained perfectly pure in

large crystals. In volume there may have been used the same or $1\frac{1}{2}$ time the amount of sulphuric acid, but the solution contains far more chromic acid than with Warington's process. The produce in chromic acid for the same quantity of sulphuric acid is consequently far greater, almost in proportion to the increase of solubility of the potash salt at the ordinary temperature and boiling-point; 1 part by weight of the salt requires at boiling-point nearly 1 part by weight of water, and the solution boils at 218°; at 64° it requires ten times the amount of water.

If, in this method, sulphuric acid is saved, the chromate of potash, on the contrary, is not wholly turned to account as in the other method; this does not render it less preferable in a pecuniary point of view, for all the residues, both the solid sulphate of potash which is mixed with chromic acid, as well as the acid liquid drained from the chromic acid, may be advantageously employed for the preparation of oxygen. It is only necessary to evaporate the acid somewhat previously, because when very dilute it does not decompose the chromic acid when heated with it. Böttger states that the residuary sulphuric acid may be used for purifying phosphorus from oxide of phosporus, an application however which is of far less frequent occurrence than the preparation of oxygen.

All the methods above described for preparing chromic acid from its potash salt, readily lead us to believe that the chromic acid is insoluble in monohydrated sulphuric acid, because it is precipitated by it from its aqueous solution; such however is not the case. Sulphuric acid ($SO^3$, HO) dissolves considerable quantities of chromic acid at the ordinary temperature, becoming yellow, and finally quite dark brown and opake. I soon cleared up this apparent contradiction, by adding a few drops of water to the solution of the chromic acid in the sulphuric acid; the chromic acid immediately separated. Since this proves that the chromic acid is precipitated from its *aqueous solution* by

sulphuric acid, but from its *sulphatic solution* by water, then there must exist a proportion between the sulphuric acid and water in which chromic acid is not soluble; to find out this proportion, I made a series of experiments, the result of which was that the amount of water of the sulphuric acid came very near to the formula $SO^3 2HO$. In fact, if we consider the solution of the chromic acid in monohydrated sulphuric acid as constituted according to the formula $SO^3,HO+xCrO^3$, then $CrO^3$ is separated on the addition of 1 atom of water.

The author then proceeds to describe a combination of chromic acid with sulphuric acid, which is obtained when the former is gradually conveyed into the latter, and the mixture shaken for some time in a well-stoppered bottle for the complete solution of the chromic acid. After some time no more chromic acid dissolves, and the dark-brown fluid, at first of an oily consistence, acquires an ochreous colour, and a pasty consistence, and even becomes sometimes granular. Its analysis is difficult, from the avidity with which it imbibes moisture. From the results obtained, however, it would appear to be composed according to the formula $SO^3 HO+CrO^3$.

In conclusion, the author observes that the solution of chromic acid in monohydrated sulphuric acid is preferable as an oxidizing agent to every other; its action on sugar or alcohol is so complete and quick, that the former, when not added in too large a quantity, may be entirely burnt into carbonic acid and water; while the alcohol, according to the quantity and degree of concentration, may be converted at pleasure either into aldehyde or acetic acid, a change which deserves mention as a very instructive class experiment, because the product of the reduction is immediately visible to the eye, and the product of oxidation readily detected by the organs of smell.—*Chem. Gaz., from Liebig's Annalen.*

## ART. XL.—ON THE PRECIPITATION OF DIFFERENT ORGANIC AND INORGANIC SUBSTANCES BY ANIMAL CHARCOAL.

By F. Weppen.

From the fact that animal charcoal precipitates a number of very different colouring matters from their solutions, it was presumed that this effect was not limited to colouring matters, and the presumption has been substantiated by the following experiments, which show that animal charcoal likewise precipitates bitter substances, resins, and substances containing tannin. The charcoal used for these experiments was obtained from bone-black by repeatedly boiling it with muriatic acid; afterwards well washing it, and then exposing it to moderate red heat.

### 1. *Organic Substances.*

1. *Bitter Substances.*—Ten grains of the substance were digested with two ounces of boiling water, and the filtered infusion shaken with the charcoal, until the bitter taste had entirely disappeared.

| Names of the bitter substance. | Quantity of charcoal. |
|---|---|
| Wormwood - - - | 30 grains. |
| Colocynth - - - | 30 " |
| Gentian Root - - - | 20 " |
| Columbo Root - - - | 10 " |
| Quassia - - - | 30 " |
| Cascarilla Bark - - - | 30 " |
| Menyanthes trifoliata - - | 30 " |

A solution of two grains of *extract of aloes* in two ounces of water, became quite tasteless with forty grains of charcoal.

2. *Resins.*—One drachm of the tincture of *guaiacum* and of the tincture of *jalap* were respectively diluted with as much alcohol; the first required thirteen grains, and the latter twenty-five grains of charcoal to precipitate the resin contained there

in to such a degree, that the solution became only very slightly clouded upon the addition of water.

3. *Astringent Substances.*—A solution of one grain of extract of *nutgalls* in half-an-ounce of water required twenty grains of charcoal; a solution of half-a-grain of *pure tannin* dissolved in half-an-ounce of water required ten grains of charcoal; an infusion of ten grains of *rhatany root* and the same quantity of *cinchona bark* in two ounces of water, required twenty grains of charcoal to deprive them of their power of reacting on the salts of iron.

2. *Inorganic Substances.*

That animal charcoal precipitates certain *metallic salts* from their solutions in water or spirit of wine, is a fact which has been long established. I find that probably all metallic solutions are similarly affected, though some require more charcoal than others. Moreover, this effect does not depend on the chemical constitution of the metallic oxide, whether its formula be $MO$ or $M_2O_3$.

The following salts were subjected to experiment:—

| | |
|---|---|
| Sulphate of copper | Chloride of tin |
| " zinc | Corrosive sublimate |
| " protoxide of iron | Acetate of the oxide of iron |
| " oxide of chromium | Nitrate of nickel |
| Nitrate of oxide of mercury | " protoxide of cobalt |
| Acetate of lead | " silver |
| Emetic tartar | " protoxide of mercury |

On an average, thirty grains of charcoal were required for every grain of these salts, dissolved in half an ounce of water; but, for reasons hereafter mentioned, it was difficult to precipitate them entirely, the addition of charcoal only rendering the reaction less distinct.

If caustic ammonia be added to those salts whose bases cannot be precipitated by ammonia, or which are redissolved by excess of the precipitant (copper, zinc, silver, lead in sugar of lead) much less charcoal is required; and the precipitation takes place much sooner. Not merely basic metallic oxides, but also

certain metallic acids are precipitated by charcoal; oxide of lead dissolved in caustic potash was precipitated by charcoal; also the acids from antimoniate of potash and tungstate of ammonia. On the other hand, no effect was obtained on arseniate and arsenite of soda; and arsenious acid dissolved in water could not be entirely precipitated by animal charcoal. Bichromate of potash and chromic acid were reduced by the charcoal, in the cold slowly but yet completely. The chromate of potash became converted into carbonate of potash. Furthermore, the charcoal precipitated iodide of mercury from the ammoniacal iodide of mercury; and sulphuret of antimony from the ammoniacal sulphuret arsenic.

A solution of iodine in water or in iodide of potassium is quickly decolourized by charcoal; but it is impossible to precipitate sulphur from its solutions in alcohol or oil of turpentine; for even after a large addition of charcoal, the filtered fluid heated over a silver plate still yielded traces of sulphuret of silver.

Salts having an alkaline base, as cream of tartar, ferrocyanide of potassium, gypsum, and alum, and also lime-water, appeared to be unaffected by charcoal; but a reaction takes place on chloride of barium, particularly if a few drops of caustic ammonia be added to the solution.

In the precipitation of metallic salts by charcoal, three circumstances may happen:—1. The salt may be absorbed without decomposition. 2. The oxide contained in the salt may be reduced; or 3. The salts may be precipitated in a basic state. With some of the salts (sulphate of the protoxide of iron and corrosive sublimate) the latter takes place. As soon as the charcoal begins to act, the solution of the salt becomes distinctly acid, and by quantitative examination, the greatest part of the acid will be again found in the fluid. This separation of the salts into acid and basic compounds is the reason why the last traces of the bases are so difficult to be removed by charcoal; for the acid which has become free prevents the perfect precipitation. Hence also, a salt to which some free acid has been added, is but little or not at all affected by charcoal.

So also if we boil with acid the charcoal which has been used for precipitation, the precipitated oxides or basic salts contained therein, can almost entirely be extracted, though the last traces of the same resist the action of the acids.

Mulder mentions in his *Physiology*, that lead can be precipitated in the metallic state from sugar of lead, by means of charcoal. If this were the case, no oxide of lead could be extracted by boiling the washed charcoal in acetic acid. Whether easily reducible, metallic oxides, for example, oxide of silver, can be reduced to the metallic state by charcoal, I have not ascertained.

It has lately been asserted that the precipitation of the metallic salts by charcoal depends on the calcareous salt, which cannot perfectly be extracted by the application of acids. If this were the case, by the application of a salt, whose acid forms a very easily soluble combination with lime, a calcareous salt would be found in the liquid standing over the charcoal.

In order to determine this I dissolved ten grains of corrosive sublimate in two ounces of water, and shook this with ten scruples of charcoal. The acid liquor was filtered, deprived of every trace of mercury by sulphuretted hydrogen, and evaporated. The last drops of the liquid certainly showed distinct traces of lime. The charcoal used in this experiment was then boiled with muriatic acid, washed, and again mixed with ten grains of a solution of corrosive sublimate. In both the second and third trials traces of a calcareous salt were found in the liquid. When the charcoal, which had been used in all three experiments, was deflagrated with nitrate of potash, and the saline mass dissolved in water, a very small residue only was obtained; which, moreover, was only partially soluble in muriatic acid. It, therefore, appeared to be improbable, that a salt of lime should be extracted out of it by means of a solution of corrosive sublimate, rather than by means of muriatic acid. And, moreover, if this even had been the case, the contained calcareous salt would have been removed after I had three times treated the charcoal with corrosive sublimate. The

calcareous salt, therefore, must have originated either from the water, or from the vessels, in which the fluid had been evaporated. In fact, after an equal quantity of water had been evaporated in a porcelain capsule, to a few drops, and only one drop of muriatic acid added, I obtained distinct evidence of the presence of lime on the addition of oxalate of ammonia. Moreover, as charcoal also precipitates substances, where the precipitation cannot depend on the presence of calcareous salts, as in the case of iodine, it is very improbable that the effect on metallic salts depends on the calcareous salts.—*Phar. Jour., from Ann. der Chimie.*

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## ART. XLI.—ANIMAL CHARCOAL AN ANTIDOTE TO POISON.

On Monday, November 17th, 1845, Dr. A. B. Garrod read a paper before the Medical Society of London, on Animal Charcoal as an Antidote to various Poisons, especially those derived from the animal and vegetable kingdoms. The following is an abstract of the paper, which will appear in the forthcoming volume of the Society's Transactions:

Dr. Garrod first noticed the experiments which had of late been made on the effects of animal charcoal in removing bitter principles from their solution, and then detailed his own experiments which led him to use it as an antidote. The results he had arrived at were,

1st. That animal charcoal removed the active principles from vegetable and animal substances when added in proper quantities, even in a solution, imitating the gastric juice, and at the temperature of the stomach (100° Fahr.)

2d. That animal charcoal will also form compounds with arsenious acid and other mineral substances, removing these

from their solutions, and that it is quite equal, if not superior, to the hydrated sesquioxide of iron, as an antidote to arsenious acid.

3d. That the compounds of the animal charcoal with the poisonous principles have no injurious action on the animal body, and therefore, when the charcoal is given with the poison, or before it has become absorbed into the system, it will act as an antidote.

4th. A certain amount of the antidote is required, depending on the quantity of active principle contained in the poison; half an ounce is more than sufficient for twenty grains of nux vomica, or one grain of strychnia; if less is given, the poison may act by its excess above the antidote.*

5th. The antidote is peculiarly adopted to poisonous substances whose activity depends on a small quantity of an active principle as opium, nux vomica, the aconites, belladonna, stramonium, tobacco, hemlock, &c.

6th. The antidote itself may be given to almost any amount, as it exerts no injurious action on the body.

7th. That it is of great importance that good animal charcoal should be used, not the bone or ivory black, which contain about $\frac{92}{100}$ of earthy matter, but the *carbo animalis purificatus* of the London Pharmacopœia. Common bone black was found to be very far inferior, certainly not possessing a fifth of the antidotal power. The vegetable charcoal was comparatively inert.

Dr. Garrod proposes, that in cases of poisoning we should remove as much of the poison as possible by means of the stomach-pump or emetics, and then give a large quantity of the animal charcoal diffused in warm water, or the antidote may be given with the emetic, but ipecacuanha must not be used, as the charcoal would destroy its emetic property. Sulphate of zinc or some other mineral emetic should be chosen. Dr.

*If animal charcoal precipitates strychnia, morphia, &c., it must be a source of considerable loss to the manufacturer of quinia, morphia, and other alkaloids and bitter principles.—[*Ed. Am. Jour. Pharm.*

Garrod also suggests that perhaps animal charcoal would prevent the action of the poison of rabies, syphilis, serpents, &c., if applied in the form of a poultice to the part which has come into contact with the poisons, and that it may prove serviceable as a remedy in some diseases, from its great power of absorbing all principles.—*Pharm. Jour.*

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## ART. XLII.—ON THE ACTION OF BITTER ALMONDS, THE LEAVES OF THE CHERRY-LAUREL, PEACH BLOSSOMS, AND THEIR DISTILLED WATERS. ON ESSENTIAL OILS, AND AROMATIC SUBSTANCES IN GENERAL.

By M. Maher.

The notice already taken of the disappearance of the smell of musk in syrup of orgeat, as established by M. Soubeiran, and recognised afterwards in the case of cherry-laurel water, by M. Fauve, of Bordeaux, led me to generalise this action upon essential oils, and all strongly scented substances.

Without being able to add to the stores of science anything as to the cause, the expriments I am about to mention may be of interest, if it were only to point out a quick and easy method of cleansing and rendering fit for any use, bottles, or vessels of any kind, which can, in many cases, only be used for the substances by which they were infected.

Very lately I wished to avoid the trouble of the sweetening, always imperfect and disagreeable, of a marble mortar I had used for the preparation of an assafœtida lotion, by means of vinegar and afterwards of ashes. I thought of trying the residuum of some almond paste, which I had

just employed in the preparation of orgeat; and having taken a portion and rubbed my mortar with it, as the smell still remained, I added a little water, when a strong odour of bitter almonds was perceptible; I rubbed it again, washed it with a quantity of water, and the smell had completely disappeared.

The first attempt induced me a few days afterwards, to apply the same plan to phials and bottles which had held camphorated eau-de-vie, oil of spike, essence of cloves, peppermint, orange, lavender, lemon, and turpentine, and the oils of petrolium, copaiba, cod's liver, creosote, and a number of odoriferous, balsamic, and resinous substances.

All these bottles were cleansed, without smell, and as if new.

But it was necessary, in the first instance, to remove the grease from those which were oily, by means of pearlash or potash, and to rinse those which contained resinous and balsamic tinctures, with alcohol, before you used the almond paste. It is clear that pure bitter almond paste, without sweet almonds, would succeed better when used in the same quantity; but the article usually sold will not succeed so well, as much, frequently, on account of its age as of its having been adulterated with bran, flour, &c.; but fresh cakes of bitter almonds may easily be procured and pulverised for the purpose.

The leaves of the cherry-laurel, and of the peach, if bruised, and reduced to a pulp, and introduced into the bottles, act in the same manner. A handful of these leaves, rubbed upon the sides of a mortar, or any other scented vessel, have, using a little water, succeeded with me as well as bitter almonds.

The distilled waters of bitter almonds, cherry-laurel, and peach, especially if they are recent, have the same effect if the same precautions are used, but it is more expensive to employ them.

It must be the same in the case of all seeds, flowers, or

leaves, that contain hydrocyanic acid, even with other odoriferous substances that have not as yet been experimented on. This explains the common practice of applying laurel-leaves to new jars and other vessels, either by placing them in an oven, or boiling them in water.

After these trials I think I may assert that the paste of bitter almonds, or a pulp of the flowers of the laurel or the peach, may become applicable to the preservation of fish and meat during their transport, and act as a condiment to them; that their distilled waters may improve the smell in dissecting amphitheatres, newly painted apartments, and rooms in hospitals. I am above all convinced of their success in removing the musty smell from vessels, and even barrels, by giving them some time to act, and frequently agitating them on account of the porous nature of the wood.

It remains now to be ascertained whether the action of hydrocyanic acid can or cannot modify the medical properties of odorous substances; it is the business of medical men to ascertain whether they ought not to suppress cherry-laurel water and syrups of orgeat, in draughts, containing distilled waters or aromatic substances.—*Chemist, from Journal de Chimie.*

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## ART. LXIII.—CHEMICAL INVESTIGATION OF THE RED POPPY, (FLOR. PAPAV. RHŒAD.)

By Leo Meier.

The author found in the poppies, vegetable albumen, gum starch, rhœadic acid, papaverate of lime, cerine, a soft resin, a fatty oil, wax and woody fibre; and in the ash, chloride of

calcium, chloride of potassium, sulphate of potash, sulphate of lime, phosphate of magnesia, phosphate of lime, carbonate of lime and magnesia. Betz and Ludwig mention the occurrence of malic and gallic acid, but this the author is inclined to doubt. The colouring principle of the flowers consists, according to the author, of two acids, one of which he calls *rhœadic acid*, the other *papaveric acid*.

To obtain the rhœadic acid pure and unaltered, a solution of acetate of lead is poured into a hot concentrated aqueous extract of the flowers; the precipitate which forms is carefully washed, alcohol of 0.889 sp. gr. added to it, and as much sulphuric acid as to leave a portion of the precipitate undecomposed, and the whole heated to boiling. The filtered solution leaves on evaporation a brilliant red amorphous mass, which is dissolved in water, and again precipitated with a solution of acetate of lead. The precipitate is washed with hot water, in which the papaverate of lead dissolves, and the residue is then again decomposed with sulphuric acid. This operation is repeated until the liquid above the lead precipitate no longer exhibits any colour. This is more quickly effected by boiling the aqueous extract of the poppies with carbonate of lead, and decomposing the rhœadate of lead with sulphuric acid. On attempting to separate the acid from the lead by sulphuretted hydrogen, it is altered.

Pure rhœadic acid is a shining dark red amorphous mass, void of odour, and of a pure acid taste: on exposure to the air, it slowly absorbs moisture without deliquescing. It has a strong acid reaction, is insoluble in ether, soluble in cold absolute alcohol and cold water. A grain of the acid imparts a red colour to an ounce of water. If the acid is not free from papaveric acid, a reddish-brown residue is each time left on evaporation and re-solution. The acid yields, with a solution of sugar of lead, a bluish-gray precipitate; the same with acetate of copper; a dark turbidness with perchloride of iron; a dark colour with caustic and carbonated alkalies, and a yellow colour with dilute nitric acid. Nitrate of silver, tincture

of galls, solution of gelatine, dilute sulphuric and muriatic acid, produce no effect. The salts of rhœadic acid are of a brownish, bluish-gray or violet colour, have no smell, and are most of them tasteless, amorphous, and all of them insoluble in absolute alcohol. The acid is not altered by exposure to the air and light, nor by hydrogen gas, although in the decomposition of the lead salt it acquires a brick-red colour. On treating the solution with chlorine, it becomes yellow, and leaves on evaporation a slight residue. When rhœadic acid is boiled with dilute nitric acid, it assumes a yellow colour, without any evolution of gas taking place. After a time some minute crystals are deposited, and there remains, on removing the nitric acid, a yellowish-brown residue, which yields a brown precipitate with a solution of acetate of lead. Concentrated sulphuric acid, and also excess of caustic potash, convert the acid into a blackish-brown mass, which dissolves in a solution of potash. When rhœadic acid is heated over a spirit-lamp on platinum-foil, it puffs up, and is carbonized without inflaming; on dry distillation, it yields an acid liquid and an empyreumatic oil.

*Papaveric Acid.*—To obtain this acid as pure as possible, the extract of flowers of poppy, prepared with hot water, is digested with carbonate of lead. The liquid filtered from the rhœadate of lead is violet, has neither taste nor smell, is neutral towards vegetable colours, and contains no oxide of lead. Oxalic acid produces no precipitate in it, although lime is detected in it on reducing it to ash. Some sulphuric acid is added to the concentrated liquid, when some gypsum separates; it is evaporated to dryness, and the residue treated with alcohol of 60 per cent. The rose-coloured alcoholic extract leaves the acid on evaporation as a shining amorphous mass, of a beautiful red colour. It is deliquescent, has no smell, a slightly acid taste, is not soluble in ether and absolute alcohol, but readily so in spirit and water. Its solution is not rendered turbid by acetate of lead, neutral acetate of copper, nitrate of silver and perchloride of iron; alkalies, barytic and lime-

water, and protochloride of tin, colour it violet; dilute acids do not alter it. Its salts are brown, amorphous, have neither taste nor smell, are soluble in water, and most of them soluble in spirit of 0.912 sp. gr. The acid can be separated from all of them, if they had been rapidly evaporated *in vacuo*, by dilute sulphuric acid; but if slowly at a gentle heat, the salts assume a black colour, leave on solution a black residue, and yield on the addition of sulphuric acid the papaveric acid with a yellowish-brown colour. If a few drops of dilute sulphuric acid are added to a solution of papaveric acid, a dark sediment subsides, which is also formed by the action of acetic acid.

*Chem. Gaz from Buch. Rep.*

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## ART. XLIV.—CHEMICAL EXAMINATION OF THE INNER BARK OF THE ELDER TREE, (SAMBUCUS NIGRA.)

By H. Kramer.

The central green bark of the elder has an odour similar to the leaves of this tree, and a disagreeable bitter taste. The brown decoction is rendered darker by ammonia, yields a black precipitate with protoperchloride of iron, a white precipitate with acetate of lead and a solution of corrosive sublimate, and a dirty white precipitate with nitrate of silver. Tartar-emetic only produced a turbidness after some time; chloride of barium and oxalic acid gave slight white precipitates. The water distilled over the fresh bark somewhat resembled in smell the *Aq. Cort. Viburn.*, and faintly reddened litmus-paper. By digestion with carbonate of baryta and evaporation, a salt was obtained which possessed all the properties of viburnate of baryta already described by the author.*

*Viburnic acid likewise occurs, according to the author, in the *Flores Sambuci*. It is combined in the *Aqua Sambuci* with ammonia, and occurs with essential oil and carbonate of ammonia. [This viburnic acid has been proved by Monro to be nothing more than valerianic acid. See p. 9 of the present volume.—Ed. *Chem. Gaz.*]

The water which escapes on evaporating the saline solution, still contained slight traces of an essential oil. Triturated with water and pressed, the bark yielded a clear liquid, which on boiling deposited flakes of albumen.

The ethereal extract of the bark, dried in the water-bath, possessed a beautiful green colour, and yielded on evaporation a green smeary mass, from which water extracted a small quantity of a tannin yielding a black precipitate with iron. Cold alcohol dissolved the mass with the exception of a green soft substance; an alcoholic solution of acetate of lead was mixed with this solution, the bright green precipitate collected on a filter, and the filtered liquid freed from excess of lead by sulphuretted hydrogen. On evaporation, it left a light brown transparent resin, which dissolved readily in ether, sulphuret of carbon, oil of turpentine and oil of almonds; less readily in alcohol, from a boiling saturated solution of which it is again partially deposited on cooling in the form of a powder. The solution has a bitter irritating taste; it does not redden litmus. It does not dissolve in acetic acid, nor in solution of ammonia or potash, and consequently belongs to the perfectly neutral resins. The lead precipitate was treated with alcohol and sulphuretted hydrogen. The filtered solution yielded on evaporation a dark brown smeary mass, of a disagreeable odour, which melted when warmed and stained paper. It dissolved readily in ether, sulphuret of carbon, fat and essential oils, and with tolerable ease in alcohol, which solution reddens litmus. On saponifying this fat, and then decomposing it with sulphuric acid, it diffused the disagreeable odour more distinctly. On combustion with nitre, it left a saline mass, which gave a precipitate with chloride of barium after saturation with muriatic acid, and consequently contained sulphur, which could not have arisen from the treatment with sulphuretted hydrogen. The portion of the ethereal extract which would not dissolve in cold alcohol contained wax and chlorophylle.

The alcoholic extract of the bark was of a light brown

colour, had an acid reaction, and left a brown transparent hygroscopic extract, soluble for the greater part in water. The tannic acid contained in it was precipitated by a solution of acetate of lead, the excess of lead removed by sulphuretted hydrogen, the liquid filtered and evaporated. In this extract grape-sugar was detected by the potash and copper test, and in the ash carbonate of potash. To determine the acid combined with the potash, the lead precipitate was boiled with water and filtered hot, when, on cooling, crystals of malate of lead separated. The portion of the alcoholic extract insoluble in water contained the above-described mixture of resin and fat.

The cold infusion of the bark was of a light brown colour, tasteless, and yielded on evaporation a transparent light brown mass, which on treatment with boiling alcohol became nearly colourless. It dissolved in a little water to a colourless liquid, which exhibited the reactions of Liebig's mucilaginous gum. It left on combustion a small quantity of carbonate of lime, which was probably contained in the plant as malate of lime. The extract remaining after evaporation of the alcoholic solution had a bitter taste, and gave precipitates with acetate of lead, nitrate of mercury and silver.

The extract obtained with dilute muriatic acid was reddish-brown: it was evaporated in the water-bath to the consistence of thin honey, and alcohol added to it, which precipitated brown mucilaginous flakes. These, after being well-washed with alcohol, were tasteless, and behaved precisely like the artificial gum which is formed on treating amylaceous plants with muriatic acid. Evaporated to dryness and extracted with water, the alcoholic solution, which contained some tannic acid, deposited a sediment of extractive. The ash of the muriatic extract consisted of chloride of calcium, sulphate and phosphate of lime, magnesia and chloride of potassium.

The alkaline decoction of the bark was evaporated in the

water-bath, and then treated with acetic acid, which produced a flocculent brown precipitate, from which boiling acetic acid removed coagulated vegetable albumen, leaving a residue of pectine.

According to the experiments of the author, the central bark of *Sambucus nigra* contains viburnic acid, traces of an essential oil, vegetable albumen, a neutral resin, an acid sulphurous fat, wax, chlorophylle, tannic acid, grape-sugar, gum, extractive, starch, pectine, malate of potash, malate of lime, sulphate of potash and lime, chloride of potassium phosphate of magnesia, lime, silica, and peroxide of iron.—*Chem Gaz., from Archiv der Pharm.*

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## ART. XLV.—ADULTERATION OF IODIDE OF POTASSIUM BY MEANS OF THE BROMIDE; THE MEANS OF DETERMINING THE AMOUNT OF THE LATTER IN THE COMPOUND.

By M. Personne.

The adulteration of iodide of potassium by the bromide of the same base, being a known fact, we thought it would be useful to publish the following process, by means of which we can not only ascertain the presence of these two products in the compound, but also determine the relative proportions of each.

When we treat a solution of iodide of potassium with sulphate of copper, we know that a protoiodide of copper is immediately precipitated, and that consequently half the iodine of the iodide remains in solution, notwithstanding the excess of sulphate that has been added.

M. Duflos has shown that we can precipitate the whole of the iodine in the solution in the state of protoiodide of

copper, if we add an excess of sulphurous acid, which, acting in concert with the iodine, reduces the binoxide of copper to the state of protoxide, by itself passing into the state of sulphuric acid.

As the same reaction does not take place in the case of the chlorides, this method has been applied to the discovery of chloride of potassium in the iodide; it remained to be seen whether it could also be employed for the detection of bromide in the same salt, I have satisfied myself by accurate experiment that it is equally correct as in the last case.

The operation is performed in the following manner :— We dissolve the suspected iodide in a sufficient quantity of cold distilled water, we add an excess of sulphate of copper in solution, we then saturate the mixture with sulphurous acid; as soon as the latter is in excess, the whole of the iodine is precipitated in the state of protoiodide of copper; while the bromide remains undecomposed, we separate the iodide of copper by filtration, and it may be weighed after being washed and dried. The water arising from the washing is to be added to the filtered liquid, we add a fresh quantity of sulphate of copper and sulphurous acid and boil the mixture; the whole of the bromide is then decomposed in its turn, and the bromine precipitated in the state of proto-bromide of copper, the quantity of which can be determined as in the first instance.

If we should be content with the determination of the presence of bromine in the compound, it is sufficient, after having separated the iodide of copper by filtration, to place the liquid in a tube, pour upon it a little ether and chlorated water, then shake it, and, if left at rest, the ether will rise to the surface, bringing with it the whole of the bromine, which tinges it of a reddish-yellow colour.

This method, by its simplicity and accuracy, is preferable to that which consists in converting the mixture into iodide and bromide of silver, which are afterwards separated by ammonia ; for the latter process almost always gives incorrect results.—*Chemist, from Journ. de Pharm.*

## ART. LXVI.—ON THE EMPLOYMENT OF THE OXALATE OF ALUMINA IN THE MANUFACTURE OF CANE AND BEET-ROOT SUGAR.

By. M. Mialhe.

In the course of my researches on digestion and assimilation I have frequently had occasion to observe the energetic action which the caustic or carbonated alkalies exert on glucose, as well as on cane and beet-root sugar, modified by acids or merely by the simple action of heat—a chemical action to which M. Peligot has directed the special attention of chemists and manufacturers. My observations have led me to reflect on the serious inconveniences which must necessarily result from the use of milk of lime in the clarification of sugars. "All the efforts of the manufacturer," says M. Dumas, "should be directed towards improving the mode of clarification, by avoiding as much as possible the use of sulphuric acid, which destroys the crystallizable sugar, and the use of the lime itself, which always imparts a urinous taste to the secondary products, and decreases their value." But can the employment of lime be suppressed in the clarifying of sugars? I think not. How then shall we proceed?

The first condition is to get rid of all the lime after clarification by means of some chemical agent, which itself is without action on the sugar. Animal charcoal answers but imperfectly; the employment of the oxalate of alumina, which I propose to substitute for it wholly or in part, admits of solving this important problem in a most satisfactory manner.

In explaining the theory of the action of the oxalate of alumina, I may call to mind,—1st, that cane or beet-root sugar, dissolved in lime-water and evaporated to dryness, does not become coloured during evaporation; 2d, that glucose and cane-sugar, after having experienced the

action of acids or an elevated temperature, both acquire under the same circumstances a very marked brownish-red colour. From these facts it follows, that if the cane or beet-root sugar submitted to evaporation contains at the same time glucose, or modified cane-sugar and lime, the product will necessarily be coloured; this is precisely what happens daily in practice. Now I propose to avoid this serious inconvenience by means of the oxalate of alumina. It suffices for this purpose to add to the saccharine solution containing lime a suitable quantity of hydrated oxalate of alumina; the lime is immediately precipitated in the state of oxalate, and the alumina set free subsides in its turn, carrying with it in combination all the colouring matter existing in the mixture—a twofold advantage, the value of which will be readily appreciated.—*Chem. Gaz. from Comptes Rendus.*

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## ART. LXVII.—NEW PROCESS FOR THE DETECTION OF ARSENIC IN ORGANIC MIXTURES.

By H. Letheby, M. B.

The author found that Reinsch's process was neither certain nor delicate; it was true that the copper would withdraw every and the smallest trace of arsenic; but when this quantity was minute, it was by no means easy to detect it afterwards. The author, therefore, reflecting upon these circumstances and upon the exceeding delicacy of Marsh's test, was led to believe that if some other metal were used, which like copper not only had the faculty of withdrawing the poison, but would also serve for the generation of hydrogen, he might be able to combine the advan-

tages of both the tests, and at the same time avoid their impediments. He found that zinc possessed such a property, removing every trace of arsenic from an organic fluid, and forming an alloy from which arseniuretted hydrogen could be developed with the greatest facility. To apply this method :—The organic liquids are to be slightly acidulated with nitric acid, adding about 10 drops to the ounce, filtered, strained through linen or muslin, and introduced into a flask with about 2 drms. of granulated zinc. The whole is kept boiling for half an hour, not too rapidly, and the mixture is kept acid by the occasional addition of a drop or so of nitric acid; during this time the arsenic will be precipitated on the zinc, giving it a grayish-black appearance. The zinc is then removed, and repeatedly washed with boiling water to remove all organic matter. If the substance is solid, as the liver, intestine or muscle, it must be previously cut up into small pieces and placed in a porcelain dish, then covered with a mixture of 2 parts of muriatic to 1 of nitric acid, and evaporated to dryness, taking care that it does not boil very rapidly; thus the tissue will be destroyed and the arsenical compound converted into arsenic acid. The charred mass containing it is broken up, boiled in two or three successive portions of water, filtered, and having ascertained that the mixed liquids are acid, introduced into a flask with the zinc as above.

The second stage of the process consists in introducing the zinc with some dilute sulphuric acid into an apparatus modified from that of Marsh. It differs from the latter in the lower curved portion being again curved in the centre, but in the opposite direction, thus forming an undulating portion consisting of three curves in the same plane, the two lateral of which have the convexity directed downwards, that of the centre being upwards. Near the summit of the longer limb, as usual, there is a bulb; the shorter limb has two bulbs, one large and close to the bottom, the

other a little above it; the first serves to hold the zinc, the second to break any bubbles which may arise. The central curve just spoken of, and the convexity of which is directed upwards, serves to prevent the gas from backing and escaping through the longer limb, and to prevent the zinc from falling into the tube below the lowest bulb in the shorter limb; a pointed piece of glass-tubing, loosely fitting the lower part of the shorter limb, should be placed in it. A cap, into which a stop-cock screws, is cemented to the upper part of the shorter limb, and two pieces are to be ground into the upper opening of the stop-cock, and so adapted that they may be removed at pleasure. One of these pieces is a jet for burning the gas; the other, a right-angled tube, to which another of Berlin glass, 6 inches long and $\frac{1}{8}$th of an inch in bore, can be connected by means of caoutchouc or bladder; to the other end of this another right-angled tube is adapted, and its lower limb made to dip into a solution of nitrate of silver. When used, the arseniated zinc is introduced into the bulb, the stop-cock screwed on, and the right-angled tube fixed on. Dilute sulphuric acid, of spec. grav. 1080 (1-7,) is then added, when the gas is evolved, and must be transmitted slowly through the solution of nitrate of silver until it begins to blacken it; the stop-cock is then turned, the right-angled tube removed, and the jet substituted. The ordinary tests may then be applied.

The solution of nitrate of silver may also be tested by precipitating with slight excess of muriatic acid, gently boiling for a short time and filtering. Evaporate the filtered liquid to dryness, then redissolve the residue in a little distilled water, neutralize with a drop of ammonia, and make it boil so as to expel any excess of the latter. On testing with nitrate of silver, the arseniate is deposited if arsenic had been present; while there is no change, or but a white cloudiness, if it had been antimony or sulphur.

The only impediment the author has found to this process

is, that a salt of mercury gives a mercurial coating to the zinc, and thus prevents the deposition of the arsenic, and the subsequent action of sulphuric acid upon it. It must however exist in very considerable quantity to offer any serious impediment.

The fallacies most likely to be met with are antimony and sulphur, both of which give a dark coating to the zinc, and evolve a gas which has the power of blackening the nitrate of silver; but these fallacies are completely guarded against in the subsequent stages of the process.

This test acts in water containing $\frac{1}{200000}$th part of arsenic, and it is not difficult to discover the $\frac{1}{2000}$th of a grain even when mixed with many ounces of organic matter, and by careful management it is possible to detect a much smaller quantity.

The principal precautions requisite to be attended to in applying this method are, that the solutions be not boiled too rapidly, that enough zinc be used to precipitate the whole of the arsenic in a thin film, that the suspected fluid be never made so acid as to act upon the zinc and liberate a gas, that the zinc be very carefully washed before being introduced into the hydrogen apparatus, that the reduction tube contain no lead, and of course that the zinc and sulphuric acid be pure.—*Chem. Gaz.*

## ART. XLVIII.—METHOD OF EXTRACTING THE IODINE AND BROMINE CONTAINED IN THE SALTS AND MOTHER-LIQUOR OF KELP SODA.

The Société d'Encouragement, in its general meeting of the 5th June, 1839, decreed a gold medal to Messrs. Delaunay, Couturier and Villedieu, of Tourlaville, near Cherbourg, for their processes for extracting iodine and bromine from soda obtained from the sea-weed, which is gathered in large quantities on the shores of Brittany.

The importance of this manufacture was made known in a report inserted in the 'Bulletin' of August, 1839; but it did not contain a description of the process. We will, therefore, make up for this omission, by giving an extract from the patent for ten years, taken by Messrs. Couturier, on the 22nd May, 1835, and which has now become public property.

1st. *Extraction of Iodine from Kelp Soda.*—The mother-waters of this soda having been concentrated to the greatest possible degree, are left in any suitable vessel, in order to allow the salts, which may be separated during its slow crystallization, to deposit; they are afterwards drawn off, and the small quantity of alkaline carbonate, which is always contained in these mother-liquors, is saturated by means of sulphuric acid. In order to be certain that the free alkali of the mother-liquors is saturated, the point of saturation must be slightly exceeded, which is ascertained when, after having sufficiently agitated the mother-liquor to which the sulphuric acid has been added, a strip of litmus paper plunged into it is slightly reddened.

It often happens that the mother-liquors of kelp contain a considerable quantity of hyposulphites which precipitate sulphur, and by the decomposition of which sulphurous acid is disengaged; in this case sulphuric acid is added, by

small quantities at a time, until no more sulphur is precipitated. This clarified liquor is put into large vessels, which must not be quite filled, to allow the liquor to be stirred from time to time.

The bottles having been placed upon a table, a current of chlorine gas is directed to the bottom of the liquor they contain. This gas must not be disengaged too rapidly, otherwise a great part of it will be lost by traversing the liquor without being dissolved: attention to this is also necessary, in order to ascertain when to stop. It is important that the liquor should be agitated as often as possible, to enable it to combine with the chlorine gas which accumulates in the empty part of the bottles.

The chlorine gas, which is mixed with these mother-liquors, acts first upon the bases of the iodides, saturates them, and separates or precipitates the iodine; this latter appears at first in the form of a reddish substance, which thickens the liquor, but it soon forms into brown flakes, which fall to the bottom. When the liquor appears no longer to be coloured red, a small quantity must be poured into a glass, and left for a time to allow the iodine floating therein to settle; after which a few drops of concentrated solution of chlorine are poured into the clarified liquor: the passage of the chlorine must be discontinued as soon as the solution ceases to thicken the mother-liqour, which, on being left in a quiescent state, allows the iodine to settle at the bottom in the form of a thick layer of brilliant brown flakes.

If the iodine is required in large flakes, the supernatant liquor may be decanted off immediately, and washed in a small quantity of cold water; it is then to be put into a retort of glass or porcelain, and sublimed; a long tube of glass, of sufficiently large diameter, being adapted to the neck of the retort. The iodine is volatilized by the heat in the form of violet coloured vapors, which are first condensed in the neck of the retort, and afterwards in the tube, in the form of small plates or flakes, having a metallic lustre

When the vapours cease to be perceptible, the operation is completed ; care must be taken to keep a cloth constantly wetted with cold water upon the whole surface of the tube. In working on a large scale, the products of several operations are united, left to drain, and sublimed as above described.

2nd. *Extraction of the Bromine from Kelp Soda.*— The mother-liquor having been completely exhausted of iodine, is introduced into a tubular retort until it is half-full; powdered peroxide of manganese and concentrated sulphuric acid of commerce are to be added to it, and an apparatus composed of three recipients, which communicate by means of pipes ground with emery, is adapted to the neck of the retort : the distillation is then proceeded with, care being taken not to let it boil too fast. The bromine which is separated by this operation is volatilized and disengaged in the form of gold-coloured vapours, which are partially condensed in the neck of the first receiver in the form of streaks and drops of a reddish-brown liquid, which run down by degrees into the receiver ; but as a considerable quantity of water is volatilized at the same time, it is condensed also, and floats upon the bromine, which occupies the lowest part of the liquor. When the coloured vapours cease to be disengaged from the retort, the fire is removed ; a fresh quantity of peroxide of manganese and sulphuric acid are then added, the retort is closed, and the fire again applied. If a sufficient quantity of these substances has been added at first, all the bromine will have been extracted ; it then only remains to collect that which is below the liquor condensed in the receiver ; this is done by means of a glass funnel furnished with a cock. When the separation is well effected, the end of the funnel is placed in a bottle, the cock is gently opened, and the bromine runs into the bottle ; the cock is shut the instant all the bromine has run through and the water is about entering. This water holds a considerable quantity of bromine in solution, which

is separated from it by collecting the residuum and saturating it with a sufficient quantity of potash. The product of this saturation is afterwards evaporated to dryness, and the residue is calcined at a dull red heat with a small quantity of coal-dust; it is then dissolved in just a sufficient quantity of water; the solution is filtered and treated in the apparatus with peroxide of manganese and concentrated sulphuric acid, as above described.

The bromine thus obtained is rectified by distillation.—*From the Bulletin de la Société d'Encouragement, as inserted in the London Journal of Arts.*

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## ART. XLIX.—OBSERVATIONS ON MYRRH, AND ON A METHOD OF DISTINGUISHING IT FROM BDELLIUM.

By L. F. Bley and E. Diesel.

The extremely different amount of essential oil obtained from myrrh, varying between 3.60 and 3.10 per cent., depends, according to the authors' observations, on the oxidation of the essential oil. Myrrh, which contains but little of this oil, always exhibits a strongly acid reaction, which is never found in that containing a greater proportion. Humidity especially favours the oxidation, and the moistening myrrh with alcohol to give it a better appearance should be entirely dispensed with. In the preparation of the essential oil, the water freed from the oil is found to have a strong acid reaction. This was saturated with carbonate of lime mixed with acetate of lead, evaporated, and treated with absolute alcohol, when formiate of lead was precipitated. This salt was decomposed by means of phosphoric acid, and the presence of the formic acid confirmed by the tests with per-

chloride of iron. The essential oil of myrrh gradually acquires an acid reaction by exposure to the air, becoming at the same time thickened to a turpentine-like mass. The residuary balsam-resin dissolves readily in ether, alcohol and oil of turpentine, has at first a slight, subsequently a strong bitter taste, and melts readily on the application of heat. The oil of myrrh is probably a carburetted hydrogen of similar constitution to the oil of turpentine. Benzoic acid is said by Brandes to occur in myrrh; the free acid, however, which he considered to be benzoic acid, appears to be nothing more than formic acid.

Pseudo-myrrh, which has been frequently found mixed with the genuine myrrh, consists of large pieces of different forms, the majority of them seeming to be fragments of a cylindrical body; they are coated externally with dust, and have a dirty reddish-brown colour; the surface of fracture is tolerably even, of vitreous lustre, brownish-yellow colour, and nearly as transparent as Senegal gum. It has a faint myrrh-like odour, and a disagreeable bitter, somewhat balsamic taste. Nitric acid dissolves it to a bright yellowish liquid, from which water separates small yellowish particles. Genuine myrrh yields with nitric acid a transparent dirty yellow liquid. *Bdellium indicum* is not dissolved by nitric acid; it softens, becomes whitish and opake. Bibulous paper, moistened with the alcoholic extract of myrrh and then with nitric acid, acquires the blood-red colour first observed by Bonastre; bdellium and pseudo-myrrh exhibit only a yellow or brownish colouring. *Bdellium indicum* is moreover distinguished by its greenish-brown colour, its more terebinthinate odour, and bitter and somewhat acrid taste. It becomes viscous when held for some time between the fingers. Myrrh yields a bright golden yellow tincture and an opake whitish residue; pseudo myrrh a light yellow tincture and a semi-transparent residue; *Myrrha indica*, a dark yellow tincture and an opake residue. An addition of water produces in the first and last a milky turbidness, and in the second no change. Nitric acid (6 drops to 20 of the tincture) yields with

*M. electa* a yellowish-white opacity, upon which after a time the periphery of the liquid acquires a bright violet colour, while the centre remains yellow. *M. indica* behaves similarly, only that the colour is darker; pseudo-myrrh does not exhibit this reaction. Fuming nitric acid produces with the tincture of *M. electa* an umber-brown, and finally a dark violet colour; on evaporation a dark gamboge-coloured residue is left; *M. indica* exhibits the same reaction; pseudo-myrrh experiences no change. *Bdellium indicum* and *africanum* are distinguished by their not assuming a violet colour on their treatment with nitric acid. About 10 grs. of myrrh, shaken with an ounce of water and filtered, yield with solutions of salts of oxide of lead a considerable precipitate. *Bdellium indicum*, treated in the same manner, exhibits scarcely any opacity.—*Chem. Gaz., from Archiv. der Pharm.*

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## ART. L.—ON THE EMPLOYMENT OF ESSENCE OF TURPENTINE AS A SOLVENT FOR CAOUTCHOUC.

By M. Bouchardat.

About ten years since I was consulted by a manufacturer of waterproof fabrics, as to the best solvent for caoutchouc. At that time either essential oil obtained by distilling coal tar, or oil obtained by the open distillation of caoutchouc, was used in England.

I commenced by carefully studying the nature of this pyrogenous oil, and separated from it several kinds of carburetted hydrogen, remarkable by their point of ebullition being very low; I was not long, however, in being convinced, that if pyrogenous oil of caoutchouc is a good solvent of that substance, its cost will prevent its being for some

length of time employed. The essential oil, obtained by distillation from tar, has a disagreeable smell, from which it is so difficult to free the fabrics, that I determined to find, if possible, another solvent.

From the first I thought of a natural carburetted hydrogen (essence of turpentine,) which it is well known acts as a solvent of caoutchouc; I hoped that by modifying it by heat its solvent properties might be augmented—I was confirmed in this idea by experience. By distilling this essence openly, once or twice, a solvent is obtained which gives satisfactory results. I also remarked, that by effecting this distillation upon fire-brick, the essence being submitted to a higher temperature, a liquid was obtained which was very little inferior, as a solvent, to the pyrogenous oil of caoutchouc.

The manufacturer who had consulted me hastened to profit by the results which I had obtained, and having reserved the right of publishing them, I made them known in my treatise upon the products of distillation of caoutchouc, inserted in vol. 23 of the *Journal de Pharmacie*. Since that time, the essence of turpentine, modified by one or two open distillations, has been the solvent for caoutchouc employed by manufacturers of waterproof fabrics in both France and England.

The following are the physical properties possessed by essence of turpentine, obtained by open distillation upon fire-brick. Its colour is yellowish; its smell partakes of that of thyme, oil of naphtha, and essence of turpentine; it is lighter than the essence from which it was made, in the proportion of 0.8726 to 0.8420. Its boiling point is 185° F.; but the temperature rises immediately afterwards to 310°, and remains stationary at that point. I have inquired whether it was not possible to isolate the former more volatile portions; but, notwithstanding great care and the best refrigerating mixtures, I have only been able to separate a very small portion, insufficient for useful examina-

tion. In general the improved essence has been found to boil at 310°, whilst before its distillation its boiling point varied from 312° to 316° F. I analysed the modified oil, and found that its composition was exactly the same as that of the primitive essence.—*Chemist, from Bulletin du Musée de l'Industrie.*

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## ART. LI.—PATENT GRANTED TO J. B. GREGSON, DUNSTON, DURHAM, FOR IMPROVEMENTS IN THE MANUFACTURE OF EPSOM SALTS AND CARBONATE OF LIME, COMMONLY CALLED PRECIPITATED CHALK, PARTS OF WHICH IMPROVEMENTS ARE APPLICABLE TO OTHER PURPOSES.

These improvements in the manufacture of epsom salts are two in number, and consist,—1st, in the application of sulphuric acid to dolomite or magnesian limestone in the uncalcined state; and 2d, in the application of muriate of ammonia to remove the lime from the mixed hydrates of lime and magnesia, obtained by thoroughly calcining and slaking dolomite.

The following is the mode of carrying out the first improvement:—The dolomite is reduced to powder, and made into a paste with water, in an open vessel lined with lead; then sulphuric acid, of 1.500 spec. grav., is added in the proportion of 350 lbs. of the latter to 200 lbs. of the former, and the mixture is well-stirred. The sulphuric acid rapidly decomposes the dolomite, and carbonic acid gas is liberated; and when the effervescence ceases, a solid substance remains, composed of the sulphate of lime and magnesia; if desired, the carbonic acid gas may be collected for use, by mixing the sulphuric acid and dolomite in a close vessel.

The mixed sulphates are separated by diffusing the solid residuum in water, allowing the sulphate of lime to subside, and drawing off the supernatant liquid, which is a solution of sulphate of magnesia, (epsom salts,) containing a small quantity of sulphate of iron; this solution is freed from sulphate of iron by means of caustic lime or magnesia, and is evaporated and crystallized in the usual way. Or the mixed sulphates may be calcined in a reverberatory furnace for 3 or 4 hours, or until the whole of the iron is peroxidized; and when this has been done, the sulphate of magnesia may be dissolved out of the mass, and the clear solution evaporated and crystallized.

The method of operating according to the second improvement is as follows:—200 lbs. of muriate of ammonia are dissolved in 100 gallons of water, in an iron boiler, by the application of heat, and the solution is allowed to cool; after which 200 lbs. of thoroughly calcined dolomite are slaked with water, and put into an iron still (holding from 300 to 400 gallons,) connected with a Woulf's apparatus containing water; the solution of muriate of ammonia is then introduced, and a gentle heat applied to expel the ammonia, which is condensed in the Woulf's apparatus, and stored for use. When all the ammonia has come over, the residuum is withdrawn from the still, and the hydrate of magnesia thoroughly washed, to free it from muriate of lime. The magnesia is then saturated with sulphuric acid, the iron it contains is thrown down by means of caustic lime or magnesia, and the clear solution is evaporated and crystallized.

The improvements in the manufacture of carbonate of lime consist,—1st, in the application of carbonic acid gas to a solution of caustic ammonia and muriate of lime, and in the recovery of the muriate of ammonia for subsequent use; and 2d, in adding a solution of carbonate of ammonia (obtained by saturating a solution of caustic ammonia with carbonic acid gas) to a solution of muriate of lime.

With regard to the first improvement, the operation is

conducted in the following manner :—100 lbs. of muriate of ammonia are dissolved in 100 gallons of water, and the solution allowed to cool ; 70 lbs. of well-burnt lime are then slaked in water, and when cold stirred into a solution of muriate of ammonia in an earthenware vessel; mutual decomposition immediately takes place, and muriate of lime and caustic ammonia are formed in the liquid. This solution is transferred to a cylindrical vessel, lined with lead, and containing an agitator covered with lead ; carbonic acid gas is then forced into the solution by means of a force-pump connected with the bottom of the vessel, and the agitator is kept revolving until the solution is entirely decomposed, which may be known by the smell of ammonia no longer arising. The vessel will now contain a milky fluid, composed of carbonate of lime and a solution of muriate of ammonia ; this fluid is removed, and allowed to settle; the clear solution of muriate of ammonia is then decanted off, and the precipitated chalk well-washed and dried. The solution of muriate of ammonia may be again used.

The mode of carrying into effect the second improvement in the manufacture of carbonate of lime is as follows :—100 gallons of a solution of caustic ammonia, of 0.970 spec. grav., are introduced into a vessel similar to that last described, and capable of holding 120 gallons; carbonic acid gas is then forced in, and the solution becomes thereby converted into a solution of bicarbonate of ammonia, which is run into a cistern containing 100 gallons of a solution of caustic ammonia, of the same specific gravity ; and a solution of carbonate of ammonia, of 1.050 spec. grav., is thus produced. This is mixed with a solution of muriate of lime, of 1.200 spec. grav., in the proportion of 2 parts of the former to 1 of the latter; decomposition immediately takes place, and the whole becomes a gelatinous mass, which must be stirred until the carbonate of lime assumes the solid form. The mass is then allowed to subside, the clear solution of muriate of ammonia is drawn off, and the carbonate of lime is washed and dried.—*Chem. Gaz.*

# MISCELLANY.

*The action of Hydrocyanic Acid as a Poison.* By Dr. Meyer.—The Doctor states as the result of his experiments with this acid on animals—

"1. That it had a paralyzing action on the peripheric nerves—*i. e.* it suppressed sensation and motion, and occasioned congestion, with augmented secretion, which was chiefly observed in the cavity of the mouth. 2. He found it to act only when received into the vascular system. On mechanically arresting the circulation, the poison did not act, although the integrity of the nervous system was preserved. On restoring the circulation, the operation of the poison was immediately observed. 3. Hydrocyanic acid does not act so rapidly as it was formerly believed. Its operation was never instantaneous. 4. Its fatal effect is owing to paralysis of the heart induced by the topical action of the blood, mixed with hydrocyanic acid, upon that organ. It required about thirty seconds for the poisoned blood to reach the heart and produce its paralysing effects, and it mattered not whether the poison was applied directly to the substance of the heart, or to parts remote from it. In Dr. Meyer's opinion, prussic acid may act independently of the brain or nerves, or of their intervention. It requires for its operation, absorption and diffusion until it reaches the heart. It is owing to this, in his opinion, that amphibia are less rapidly killed by this poison than mammalia, the action of the heart in those animals being less necessary for the maintenance of life. Nevertheless, in a certain dose the poison may act upon and paralyze the nervous system, producing tetanic convulsions, congestion of the veins, and exudations in the serous cavities. It is not true, as it is generally believed, that in death from prussic acid the blood does not coagulate. Dr. Meyer found that this liquid coagulated in the bodies of the animals which were killed in his experiments."—*British and Foreign Review.*

These observations are to a certain extent confirmed by an experiment of Liebig. He endeavors to prove that prussic acid does not act by sympathy through the nervous system, nor is it absorbed directly into the blood; but that it can only act through the medium of its vapour on the pulmonary mucous membrane. If this statement be correct, it may be made to act as a poison, and yet with difficulty be discovered after death.—*Chemist.*

*Novel application of Hydrochlorate of Morphine.* By M. Ehrard.—It is well known that all kinds of neuralgia, and more particularly odontalgia, are very difficult of cure, although they may be considerably modified by means of preparations of opium, and particularly hydrochlorate of morphine. M. Ehrard believes, that if this last substance is not more efficacious, it is because it is not properly administered.

In fact, hydrochlorate of morphine, according to M. Ehrard, should be applied to the gums by friction on the affected side. M. Ehrard asserts that this simple change in the mode of application will, in a short time, remove the most afflicting toothache.

The author makes several observations which appear to be decisive. It is particularly in the case of those who are feeble, delicate, and extremely nervous that this mode of treatment is successful, and in many cases the pain arising from carious teeth has disappeared as if by enchantment.

The following is the mode of proceeding adopted by M. Ehrard:—

The first day the patient takes 13 milligrammes of the medicament on one of his fingers, previously wetted, and he rubs the affected gum with it for the space of three minutes, he then holds his head on one side, taking care neither to spit nor swallow, to give time for the absorption of the salt; and afterwards he swallows his saliva.

At the end of two hours the operation is to be repeated.

On the following day, if the disease continues, we increase the dose, if necessary, to 37 milligrammes.

In frontal neuralgia, M. Ehrard employed hydrochlorate of morphine with the most marked success, by applying it to the mucous lining of the nostrils.—*Ibid, from Jour. de Chir.*

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*New mode of preparing Adhesive and Strengthening Plasters from India-rubber.* By William H. Shecut and Horace H. Day, of New York.—The articles we employ in the preparation of the said plasters, are those known in commerce as caoutchouc, or India-rubber pine gum (obtained from the southern yellow pine, commonly termed "long leafed" pine,) cayenne pepper, balsam of Peru, litharge, and spirits of turpentine.

The proportions are five pounds India-rubber, reduced to fine shreds, steeped in soft water for softening it, then put, with sufficient quantity of spirits of turpentine to cover the India-rubber, in a vessel: the quantity to be increased as the gum soaks it up. When the rubber is sufficiently dissolved, it is pressed through a fine sieve. Four ounces of capsicum annuum, or cayenne pepper, is heated in a quart of spirits of turpentine. A portion of this tincture is ground with a pound of litharge and then mixed with the remnant of the tincture, and to it is

added six ounces of the balsam of Peru. Then melt a pound of pine-gum, and add spirits of turpentine until it is thin enough to strain, and finally, all the preceding preparations are mixed together.—*Ibid, from Jour. de Phar.*

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*On a new Process for obtaining pure Chlorine Gas.* By Profs. R. E. Rogers and W. B. Rogers.—This process is founded on the powerful oxidating action of chromic acid, especially when liberated in a solution, and consists in causing a reaction between hydrochloric acid and this substance, in which the chlorine of the former is set free. Our mode of proceeding is as follows:—

To 1 part of powdered bichromate of potash, in a small retort or flask, we add six parts of hydrochloric acid, of spec. grav. about 1.16, and apply a gentle lamp heat for a few seconds, so as to bring about a brisk reaction. The chlorine is now rapidly evolved, and continues to be disengaged as fast as is convenient, without requiring any further application of the lamp.

Referring to the composition of the bichromate of potash and of hydrochloric acid, it will be seen that 1 *equivalent of bichromate of potash and* 7 *of hydrochloric acid, are capable of evolving* 3 *equivs. of chlorine,* at the same time giving rise to 1 equiv. of the sesquichloride of chromium, 1 of the chloride of potassium, and 7 of water.

In order to ascertain how near we might approach to the equivalent quantity of chlorine above deduced, we resorted to the following method:—Knowing that a strong solution of chloride of sodium is much less absorbent of the gas than ordinary water, we prepared a quantity of saturated brine, through which we passed chlorine until the liquid appeared to be fully charged. With this we filled a tall graduated vessel, designed to receive the gas, and a porcelain bowl, which served as a pneumatic trough, and having placed 4 grms. of the bichromate with an excess of hydrochloric acid in a small retort, we passed the gas as it was evolved through the chlorous saline solution into the narrow graduated jar. After urging the process until the action entirely ceased and no further gas escaped, we measured the resulting gas with the usual precautions at 60°. Its volume was found to be 54.5 cubic inches. On repeating the experiment with the same amount of bichromate and acid, and with the same brine, we obtained in the second trial 55.5 cubic inches, and in the third 56.2 cubic inches of the gas, the increase being evidently due to the diminished absorption arising from the more complete saturation of the liquid with chlorine.

Taking 76.5 grs. as the weight of 100 cubic inches of chlorine at 60° F., the volume due, to the entire decomposition of 4 grms. of bichromate of potash is 57.3 cubic inches. It thus appears that, with proper

precaution, this process may be made to yield $\frac{5}{5}\frac{6}{7}$ths, or nearly the whole theoretical amount of the gas.—*Silliman's Journal.*

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*On the Preparation of crystallized Sulphuret of Calcium.* By Dr. E. Riegel.—The best process for procuring pure sulphuret of calcium is that recommended by Liebig, according to which 4 parts calcined gypsum, 1 part powdered charcoal, and $1\frac{1}{2}$ part meal, are kneaded with water to a paste, which is formed into pellets, which when perfectly dry are arranged with charcoal in alternating layers, and exposed to a red heat. On heating to redness a mixture of equal parts of hydrate of lime and sulphur, a preparation is obtained which contains a considerable quantity of sulphate of lime. On boiling 1 part hydrate of lime with $2\frac{1}{2}$ parts sulphur and 16 parts water for a length of time, the author obtained a brownish-yellow solution, from which on cooling some red acicular prisms separated. The crystals were quickly decomposed by exposure to moist air.—*Chem. Gaz. from Jahrb. für Prakt. Chem.*

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*Stopping for the Teeth.* By M. Bernoth, of Warasdin.

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| ℞ Powdered mastic | 90 grammes. |
| Sulphuric ether | 40 " |

Digest for several days, strain it through a cloth, then add native alum in fine powder, in sufficient quantity to form a plastic mass, with which small phials, holding 8 grammes, are to be filled, having first poured into each

| | |
|---|---|
| Camphorated alcohol | 2 grammes. |
| Essence of cloves | 1 gramme. |

This stopping introduced into the cavity of a carious tooth, first well cleaned and dried, is extremely useful on account of the great degree of hardness it acquires.—*Chemist, from Archiv. de Phar.*

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*Advantageous Method of preparing Gallic Acid.* By F. Mueller.—The author recommends Braconnot's method for preparing gallic acid, modified as follows. He boils 16 oz. of coarsely-pounded so-called heavy blue galls three times with 8 lbs. of water in a tin sauce-pan, strains the decoction, and lets it stand for 4 months in a covered earthenware pan, at a temperature of 100°—122°, now and then replacing the evaporated water and well agitating. The mould, as well as the crusts which form, are after this time collected on a filter, slightly washed with cold water and dried, then boiled with 4 parts water, filtered, and the residue well washed with hot water. The crystals which separate from the filtered solution on cooling are sepa-

rated from the mother-ley, slightly washed, dissolved in a little boiling water, and set aside to crystallize. The crystallized acid is collected on a filter, rinsed once or twice with water, dried, then digested for several days with 3 oz. of alcohol and 1 oz. of purified animal charcoal, heated to boiling, filtered, and evaporated at a very gentle heat. The still slightly brownish crystals are again collected on a filter, rinsed with spirit, dissolved in 3 parts boiling water, and set aside to crystallize. The crystals obtained were now of a beautiful white colour, silky lustre, and perfectly pure. The mother-ley yielded on evaporation a small quantity of brownish-yellow crystals. The produce in beautiful white gallic acid amounted to $2\frac{1}{2}$ oz. In another experiment, 3 lbs. of galls yielded 8 oz.—*Chem. Gaz. from Archiv. der Pharm.*

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*New Test for Prussic Acid.*—The following new method of testing for hydrocyanic acid is proposed by Mr. Richard Austin, jr., of this city. The precipitate of cyanide of silver, say $\frac{1}{2}$ gr., obtained in the usual manner, is mixed with a small quantity of oxide of iron and carbonate of potash, and the whole fused together in an iron or platinum capsule. The fused mass is then dissolved in $\frac{1}{2}$ oz. of distilled water, filtered, and rendered slightly acid by the addition of a few drops of hydrochloric acid. The liquid thus treated is next divided into two portions, to one of which a few drops of a solution of sulphate of copper is added, which immediately causes the evolution of the chocolate brown colour, so characteristic of the ferrocyanide of copper; and to the other a few drops of the muriate tincture of iron, or any persalt of iron, when the solution becomes intensely blue by the formation of the ferrocyanide of iron, the ordinary prussian blue.

In Mr. Austin's opinion, "these two tests, with the well-known odour of prussic acid, are, *independent of all others*, sufficient to convince the medical jurist of the presence of free prussic acid." Mr. Austin adduces several arguments to show the superiority of this test over those already known to chemists, both in accuracy and facility of application, by persons not skilled in chemical manipulation.

The precipitates above mentioned are very distinctly obtained with $\frac{1}{2}$ gr. of cyanide of silver.—*Dublin Hospital Gazette.*

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*Method of detecting very minute Quantities of Copper in Organic Fluids.* By M. Filhol.—A very delicate test consists, according to Virgain, in immersing a piece of metallic iron in the fluid contained in a platinum crucible, when the copper is deposited on the platinum, and may then be dissolved with a few drops of nitric acid. The author proposes the following modification of this method:—He acidifies a large quantity of the fluid under examination in an evaporating dish, and then im-

merses in it a piece of platinum foil surrounded by a small zinc plate, when the copper is deposited on the platinum, colouring it red, and can be dissolved with a few drops of nitric acid.—*Chem. Gaz. from Journ. de Med. et de Chim. de Toulouse.*

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*On a new Acid in the Root of Robinia.* By Hugo von Reinsch.—The author was induced, by the liquorice-like smell and taste of the acacia-root, to submit it to chemical examination; in the course of which he discovered a peculiar acid, *robinic acid*, which occurs in the root in combination with ammonia. The presence of this salt is readily detected, even by exhausting with boiling water only 2 drms. of the root, evaporating the filtered solution to the consistence of a syrup, and setting it aside for some time. In the course of 12 hours, a tolerable quantity of hard rhombohedrons of robiniate of ammonia, with a vitreous lustre, will be found to have separated. This salt dissolves without colour in 20—30 parts water, is void of taste and smell, and has no action on litmus-paper. The hot concentrated solution is not altered by carbonate of soda; with chloride of calcium, it yields a flocculent crystalline, and with chloride of barium a pulverulent precipitate; peracetate of iron produces a yellowish turbidness, nitrate of silver a slight opacity, protosulphate of iron a white precipitate, basic acetate of lead a white precipitate after some time, and protonitrate of mercury a flocculent white precipitate. As the acid forms with lead a soluble compound, the author combined it with protoxide of mercury, and treated this with sulphuretted hydrogen. In this way a colourless syrup was obtained, which on the addition of alcohol became converted into a mass of acicular crystals. From the smallness of the quantity, it could not be submitted to more accurate investigation. Besides the robiniate of ammonia, there also occurs in the root, sugar (no glycyrrhizine,) fat and essential oil, chlorophylle, wax, tannic acid, a yellow-colouring principle, which becomes reddish brown by alkalies, mucilage, much albumen, starch, salts, and an alkaloid, which the author has not yet succeeded in isolating.—*Ibid. from Jahrb. für Prakt. Phar.*

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*On the Preparation of Benzoic Acid.* By Dr. L. Bley and E. Diesel.—The authors found, on comparing the various methods hitherto recommended, that no one perfectly answered the purpose, and propose the following:—8 parts of coarsely-powdered benzoin are heated to boiling with 3—4 parts hydrate of lime and 80 parts water, with constant stirring. The mass, pressed between linen, is boiled again twice with a little water, and again submitted to pressure. When the liquid has become sufficiently clear, it is filtered, and is evaporated down to one-fifth; a slight excess of muriatic acid is then added to it, when the acid separates in beautiful crystals on cooling. It is purified by reso-

lution in hot distilled water, filtration and crystallization. On concentrating the liquid containing the chloride of calcium and the wash-water from the separated acid, a further quantity of slightly-coloured benzoic acid is obtained. 100 parts benzoin from Siam yielded 7 parts of pure and $1\frac{1}{2}$ part of somewhat coloured acid. Another kind gave 11 per cent. pure and 2 per cent. slightly coloured acid. A sample of *Styrax amygdaloides* yielded 13 per cent. pure and 2 per cent. impure acid. According to the experiments of the authors, the proportion of acid seems to vary in the different kinds, but the *Styrax amygdaloides* appears to contain most.—*Ibid, from Archiv. der Pharm.*

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*Observations on a New Substance brought from America.* By M. Guibourt—In the month of August last M. Leory, a pharmaceutist at Brussels, sent me a volatile oil, very remarkable, on account of its flowing abundantly from a vegetable, without its being necessary to have recourse to distillation to obtain it. I much regret that I have neglected this communication up to the present time. At Bogota, from whence it is brought, this oil is called *aceite of amacy*. The tree that produces it is at present unknown, but it grows abundantly in the moist virgin forests in the neighbourhood of Bogota; it contains so large a quantity of the essence, that it is sufficient to wound a branch, and suspend a vessel from it, to collect a litre in a very few minutes.

The essence is liquid, of a very pale yellow colour, not greasy to the touch, its taste is sweet at first, then hot, pungent, and bitter. Cold, a few degrees above the freezing point, does not render it solid. Its smell according to M. Leroy much resembles that of orange blossoms, but to me it appeared more like that of the rose, or rather the essence of *licari*, rosewood. M. Goudot, to whom I showed it, told me that this essence came from forests situated about seven or eight leagues from Bogota, but he was not acquainted with the tree that produced it, and that it was employed at Bogota in the adulteration of copaiba. It is, in fact, certain that the copaiba that reaches us from Maracaibo and other parts of Columbia, much resembles it in smell; this, up to the present time, has been attributed to it, solely, on the ground that it was produced by a particular species of *copabifera*.—*Chem., from Journ. de Pharm.*

# REPORT

OF THE

# PHILADELPHIA COLLEGE OF PHARMACY,

WITH

# A CATALOGUE

OF ITS

# MEMBERS AND GRADUATES.

Published by direction of the Board of Trustees.

PHILADELPHIA:
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1846.

# REPORT.

The length of time that has elapsed since the organization of the Philadelphia College of Pharmacy, and its steadily increasing reputation and usefulness, have placed it among the established institutions in our country for the promotion of science. It has been thought that a succinct account of its origin, objects, and operations, would prove gratifying to the profession, a large number of whose members in this city are graduates of the institution; and at the same time would tend to disseminate its benefits, by exciting an interest in it, among a class who, from ignorance of its character and history, have failed to avail themselves of them. With such intentions the present notice has been drawn up.

Prior to the year 1821, attention was directed towards, and complaints prevailed with respect to the abuses in the Drug and Apothecary business. To remedy the evils which existed, a proposition was made, on the part of the Trustees of the University of Pennsylvania, instigated by the representations of one or more of the medical professors in that school, to grant the degree of Master of Pharmacy to such persons as were recommended as qualified to conduct the business of Pharmacy, and had complied with certain requisitions. This proposition was declined by the "Druggists and Apothecaries of the city and liberties of Philadelphia," on the ground that it was "liable to serious objections, and inadequate to the attainment of the objects which it had in view;" and it was determined at a meeting held March 13th, 1821, at the recommendation of a committee to whom the subject had been entrusted, to form

an independent association. This took the name of *College of Apothecaries.*

From the preamble to the resolution to establish this association, it appears that the objects proposed to be accomplished were, to obviate a "departure from the correct customs and established principles of the Drug and Apothecary business," to direct attention to the "qualities of articles brought into the drug market;" to secure "the discussion of subjects relating to the business," and "communicate information beneficial and interesting to the trade," and to create a "school of Pharmacy," in which lectures should be delivered "expressly for the information and instruction of Druggists and Apothecaries."

The organization of the college being completed by the election of the proper officers, the draft of a constitution, and the adoption of bye-laws; in the following year, March 21st, 1822, it was resolved to change the title of the institution to that of COLLEGE OF PHARMACY, and an act of the legislature of Pennsylvania was obtained, bestowing upon it the powers and privileges of an incorporated body. The charter thus obtained dates March 30th, 1822.

One of the first special acts of the college, in conformity with the design for which it was established, was the formation of a school of Pharmacy. The first courses of lectures were delivered in 1821, and they have been continued annually until the present time. From the period when instituted until the spring of the present year, 1846, two professorships only existed; one embracing Materia Medica and Pharmacy, the other, General and Pharmaceutic Chemistry. From the success of the school, however, and the obvious desire for increased advantages of education, it has been deemed proper to separate pharmacy from materia medica, and to erect a new chair devoted to instruction in "Pharmacy." During the ensuing season therefore three courses of lectures will be delivered. The degree of GRADUATE IN PHARMACY is the distinction conferred on those who have

merited the honors of the institution, by compliance with the requisites for graduation.

In the original organization of the school, the chair of Materia Medica and Pharmacy was allotted to Dr. Samuel Jackson, one of the first and most active members of the college, who filled it until the year 1827, when other and more pressing engagements induced him to resign; he was subsequently elected to the station of Professor of the Institutes of Medicine in the University of Pennsylvania. He was succeeded by Dr. Benjamin Ellis, who filled the station with commendable zeal and industry, and with talents that admirably qualified him for its duties, until the year 1831, when the members of the college and the class were called to mourn his death, in the midst of his honorable and useful pursuits.

Dr. Ellis was succeeded by Dr. George B. Wood, who had previously occupied the chair of Chemistry in the college. He continued professor of Materia Medica and Pharmacy till the year 1835, when he was called to a field of more extended usefulness, by his election to a similar professorship in the University of Pennsylvania.

Dr. R. Egglesfield Griffith was next chosen professor, and lectured until the following year, when he accepted a professorship in the University of Maryland, and was succeeded by Dr. Joseph Carson, the present occupant of the chair.

The chair of Chemistry having been originally occupied by Dr. Gerard Troost, and subsequently by Dr. George B. Wood, in 1831 its duties devolved upon Dr. Franklin Bache, who continued his labors as teacher of that important branch until, in 1841, he was elected to a similar station in the Jefferson Medical College of Philadelphia. William R. Fisher, a graduate of the institution, who had been professor of Chemistry in the University of Maryland, and was extensively known as a skilful and accomplished apothecary, was next elected to the station, from which however

he withdrew after a single course of lectures. His death which ensued a short time afterwards, was cause of deep regret to numerous members of the college, to whom he was endeared by long and well tried friendship.

Dr. Robert Bridges, the present professor of Chemistry, succeeded Professor Fisher in 1842.

Soon after the establishment of the school, Solomon W. Conrad was appointed to lecture upon Botany and Mineralogy, in connection with its course of instruction, but it was not found expedient in the then existing state of the college to continue his lectures as a part of the regular course. The establishment of a separate course on Pharmacy, as before stated, is of recent origin. It is under the charge of a graduate of our college, and a practical apothecary of considerable experience, who is already widely known as a writer on chemical and pharmaceutical subjects.

During the changes we have noticed, the class has fluctuated in numbers according to circumstances, though recently with a steady increase, which warrants the hope that it may at no distant period attain a size better proportioned to the numbers engaged in the exercise of our profession, and the advantages to be derived from a thorough and systematic education in the sciences, which are necessary to form the accomplished apothecary.

Another object which claimed the attention of the college soon after its establishment was the formation of a Library. To attain this object much outlay was made at the commencement, and a respectable collection of books was the result, which, through the subsequent liberality of the members and friends of the institution, both in donations of money and works from their own collections, now numbers 600 vols. This comprehends works not only on Pharmacy and the sciences which are allied to it, but extends to science generally, the arts and other subjects of interest and importance. The library is accessible both to the members and students of the college.

Among the designs of the founders of the college, as stated previously, was that of securing "the discussion of subjects relating to the business," and of communicating "information beneficial and interesting to the trade." In furtherance of these objects, in addition to verbal discussions, from 1821 to 1829 a number of papers were read before the body, and were regarded of sufficient importance to be presented to the public; a journal consisting of four numbers was issued during this period, but appeared at distant and irregular intervals. It was then regarded as important to establish a periodical journal, not restricted to original essays, but to combine with them such information pertaining to pharmacy and its kindred sciences, as could be procured from the periodicals and works of the day. The work thus commenced was called the "JOURNAL OF THE PHILADELPHIA COLLEGE OF PHARMACY." It was continued under this title through six volumes, when in 1835 it was issued by the more comprehensive name of "THE AMERICAN JOURNAL OF PHARMACY." Seventeen complete volumes have now appeared, and from the length of time this publication has been in progress it has become a rich repository of information. "In its pages are to be found valuable communications from our own countrymen, as well as a summary of the researches of foreign investigators. It is a record of the improvements that have been introduced during the period of its continuance."

Under the management of the College of Pharmacy, the Journal has been an influential instrument in enabling it to obviate a "departure from the correct customs, and established principles of the Drug and Apothecary business, and to direct attention, to the qualities of articles brought into the drug market." From a perusal of its contents, it will be found that the morals of the profession have not been disregarded, and the kinds of fraud and deception to which pharmacy is obnoxious, abundantly instanced and freely commented on. It is only to be regretted, that from

the limited powers with which the institution is endowed, a personal supervision cannot be exercised, and departures from a correct standard of practice be visited by exposure.

During the year 1842, a change was made in the meetings of the college, by distinguishing between such as were for general business, and such as should be exclusively devoted to scientific purposes, called "Pharmaceutical Meetings." At the latter, matters of general interest to the profession are discussed, and essays read upon subjects of science, which, if of sufficient importance are afterwards published in the Journal.

In the successive revisions of the National Pharmacopœia the College has always taken a lively interest, and assistance has been afforded to the framers, when solicited. For the benefit of the Pharmacopœia of 1840, a thorough revision was effected and a full report drawn up, a large portion of which was embodied in the work. The privilege of representation in the next convention will doubtless draw forth an able coöperation in the labour of revision.

Having experienced much inconvenience from the restricted accommodations of a rented building, in the year 1832 the college erected a hall for its especial accommodation. The building is situated in Zane street above Seventh. It is spacious and airy, possessing ample room for the lectures and collections belonging to them, for the library, and for the purposes generally of the institution.

The building is 30 feet 9 inches front on Zane street, by 46 feet in depth, and 57 feet high; it contains four stories, which are accessible by three distinct entrances, and is lighted and ventilated by windows on three sides.

## ANNOUNCEMENT OF THE LECTURES FOR THE ENSUING SEASON.

The lectures will be held in the hall of the College, Zan street, on the evenings of Tuesdays, Thursdays, and Saturdays, beginning the third week in October, and continuing until the latter end of March, two lectures being delivered each evening.

The lectures on MATERIA MEDICA will be delivered by JOSEPH CARSON, M. D.

This *course* is devoted exclusively to the consideration of the articles of Vegetable and Animal origin. It comprises an account of the sources from which they are derived, their character, commercial history, chemical composition, and medicinal properties, with the preparations made from them.

In connection with the characters of genuine drugs, their adulterations will be exhibited, and the means of detection pointed out.

When detailing the sources from which drugs are derived, the *Botanical* and *Zoological* description of plants and animals affording them will be given, and an exposition of the systematic arrangement to which they belong, as also an explanation of the Nomenclature by which they have been designated in our own and other Pharmacopœias.

To render the entire course practical and demonstrative, the lectures will be accompanied with the exhibition of an extensive and complete collection of the substances described, comprising their varieties, modifications, and falsifications; of a collection of accurate drawings, and a full series of dried specimens of plants both exotic and indigenous.

Where it may be practicable, experiments will be conducted in the presence of the class, to show the proximate principles contained in particular articles, the means by which these may be detected or separated, the difference between genuine and spurious articles, and such other chemical facts as may be interesting or important.

The lectures on CHEMISTRY will be delivered by ROBERT BRIDGES, M. D.

In this *course*, a systematic view of the science and its present condition will be presented to the student.

The imponderable substances will first attract attention, and sufficient time be devoted to caloric, to elucidate its laws and practical applications.

The ponderable bodies will be introduced by a consideration of the reactions of chemical affinity and the laws of chemical combination, with some notice of symbols or chemical notation.

Individual elements, under their distinct classes, will be then noticed, and the inorganic combinations resulting from their union will be considered in such relations to them as may facilitate their acquisition by the learner. Every article of any importance will be described and exhibited both in the crude and perfect condition, and the processes for their production or formation detailed, and when practicable shown. Commercial impurities (whether of design or accident) will receive their requisite attention, together with the best and easiest modes for detecting and purifying the adulterated articles.

Organic chemistry will finally receive its full share of attention, and all its compounds, possessing either general or pharmaceutical interest, will be brought under consideration.

Illustration by experiment and diagram will be introduced wherever they may be rendered available, to convey a knowledge of the fundamental principles of the science, through every channel for the reception of important truths.

The Lectures on PHARMACY will be delivered by WILLIAM PROCTER, Jr.

This *course* will commence with the consideration of the elementary operations which are required in the preparation of medicines. They include, for instance, the management of heat, the manipulations in the processes of pulverizing, dissolving, evaporating, distilling,

crystalizing, etc., which will be illustrated, by appropriate apparatus, or by models and diagrams, the tendency of which will be to familiarize the student with many practical operations, but rarely if at all performed in the ordinary routine of the shop.

The second part of the lectures will treat of the collection and desiccation of some drugs, and their selection and preservation generally as a duty of the apothecary, and of the preparation of those remedies which do not fairly come within the influence of chemical action; comprehending the powders, pulps, extracts, tinctures, distilled waters, volatile oils, infusions, etc., as well as that extensive but heterogeneous list of medicines which are obtained by mixing, as compound powders, confections, pills, troches, cerates, and ointments, and other external remedies. In conducting this part of the course, it is intended to give the student as thorough an insight into the preparation of medicines, as comports with the time afforded; including those which are officinal, and such as have been so far recognized as to be kept ready prepared in the shop.

The third portion of the course will relate to the preparation of those chemical remedies, which come within the scope of the apothecary's laboratory, and which may be prepared by himself when desirable; including many metallic, saline, and organic substances, the ethereal and ammoniacal products, without reference however to their systematic chemical relations, and it will conclude with some general observations on the duties of the pharmaceutist, bearing especially upon extemporaneous, and toxicological pharmacy.

## FEES.

The matriculation fee is *two* dollars, payable to the secretary of the Board of Trustees, and the price of tickets is *eight* dollars for each course, payable to the professors respectively. The fee for the Diploma is *five* dollars. Students who have previously matriculated, and all who are

apprenticed to members of the college, are exempt from the matriculation fee, but they must invariably obtain the matriculation ticket before the commencement of each course. Graduates and members of the college, and all students who have paid for two full courses of instruction in the college, are admitted to the lectures gratuitously.

## QUALIFICATIONS FOR GRADUATION.

Every person upon whom a diploma of this college shall be conferred, must be of good moral character, must have arrived at the age of twenty-one years, have attended two courses of each of the lectures delivered in the college, or one course in the college, and one course in some other respectable school of pharmacy, and have served out an apprenticeship of at least four years, with a person or persons qualified to conduct the Drug and Apothecary business; of which circumstance he must produce sufficient evidence to the Board of Examiners.

He shall also be required to produce an original dissertation or thesis, upon some subject of the materia medica, pharmacy, chemistry, or one of the branches of science immediately connected therewith, which shall be written with neatness and accuracy, and with the evidence of apprenticeship, be deposited with the senior professor of the school, on or before the twentieth of February, of the session in which the application shall be made. He must also be recommended in writing by the Committee of Examination and the professors jointly, and if his application be finally approved of by the Board of Trustees, he shall, upon payment of five dollars to the treasurer, receive the diploma of the college.

## COMMENCEMENTS.

Public commencements for conferring degrees upon the candidates who shall have been recommended by the Committee, and approved by the Board, are held at such times as the Board of Trustees may direct.

## OFFICERS OF THE COLLEGE.

*President.*

DANIEL B. SMITH.

*Vice Presidents.*

CHARLES ELLIS.
SAMUEL F. TROTH.

*Secretary.*

DILLWYN PARRISH.

*Corresponding Secretary.*

WILLIAM HODGSON, JR.

*Treasurer.*

JOSEPH C. TURNPENNY.

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*Secretary of the Board of Trustees.*

EDWARD PARRISH,

N. W. corner of Ninth and Chesnut streets.

To whom students wishing to matriculate are requested to apply.

## LIST OF RESIDENT MEMBERS OF THE PHILADELPHIA COLLEGE OF PHARMACY.

Original Members.

- Daniel B. Smith, - 1821
- Warder Morris, - - 1821
- Peter Lehman, - - 1821
- James W. Simes, - 1821
- John P. Wetherill, - 1821
- Charles Rizer, - - 1821
- Edmund Pryor, - - 1821
- George D. Wetherill, - 1821
- Peter Williamson, - 1821
- Jacob Bigonet, - - 1821
- Frederick Klett, - 1821
- Frederick Brown, - 1821
- Charles Ellis, - - 1821
- Thomas Oliver, - - 1821
- Alex. Fullerton, jr. - 1821
- Algernon S. Roberts, - 1821

Joseph Reakirt, - - 1821
Samuel F. Troth, - - 1822
Edward Roberts, - - 1824
Samuel C. Sheppard, - 1825
Elias Durand, - - 1825
Samuel P. Shoemaker, - 1826
John Horn, - - - 1826
Wm. Biddle, - - - 1826
Charles Schaffer, jr., - 1827
Wm. Hodgson, jr., - - 1828
George B. Wood, M. D. - 1829
John C. Allen, - - 1830
Dillwyn Parrish, - - 1831
Franklin Bache, M. D., - 1831
Franklin R. Smith, - - 1831
Joseph C. Turnpenny, - 1834
Thomas H. Powers, - - 1834
Thomas J. Husband, - - 1834
John Bringhurst, - - 1834
Samuel Simes, - - 1835
Armon W. Davis, - - 1836
Joseph Carson, M. D., - 1836
Wm. Wetherill, M. D., - 1837
Job Jones, - - - 1837
James Hopkins, - - 1837
John Wetherill, jr., - - 1837
George Cuthbert, - - 1837
John C. Lehman, - - 1837
Charles Moyer, - - 1837
Alexander Ardley, - - 1837
Lewellyn S. Haskell, - 1837
Thomas P. James, - - 1838
Henry W. Worthington, - 1838
Richard W. Test, - - 1839
Robert Bridges, M. D., - 1839
John Gilbert, - - 1839
Ambrose Smith, - - 1839
Linnæus R. Gilliams, - 1839
Claudius B. Linn, - - 1840
Wm. Procter, jr., - - 1840
Augustine J. L. Duhamel, - 1840
Robert B. Potts, - - 1841
Paul G. Oliver, - - 1841
J. C. De la Cour, - - 1841
John H. Ecky, - - 1841
James L. Elliott, M. D., - 1841
Edwin Meredith, - - 1842
James V. Machette, - - 1842

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|---|---|---|---|
| Henry C. Blair, | 1842 | Robert C. Brodie, | 1845 |
| Robert Shoemaker, | 1843 | Samuel N. James, | 1845 |
| Caleb H. Needles, | 1843 | Henry W. Gillingham, | 1845 |
| Samuel Wetherill, | 1843 | Peter Babb, | 1845 |
| Edward Parrish, | 1843 | Jacob R. Taylor, | 1845 |
| John Y. Goodyear, | 1843 | J. P. Wilson Neill, | 1845 |
| J. Crawford Dawes, | 1843 | Daniel S. Jones, | 1845 |
| Jacob L. Smith; | 1843 | Wm. J. Jenks, | 1846 |
| Edward S. Wayne, | 1844 | Alexander F. Hazard, | 1846 |
| Wm. P. Troth, | 1844 | John C. Baker, | 1846 |
| Albert S. Letchworth, | 1844 | Wallace Marshall, | 1846 |
| John Harris, M. D.. | 1845 | Henry H. Kelly, | 1846 |
| William Ellis, | 1845 | Daniel L. Miller, jr., | 1846 |
| John Reakirt, | 1845 | James N. Marks, | 1846 |
| Benjamin I. Ritter, | 1845 | Ellwood Wilson, M. D., | 1846 |
| Wm. N. Needles, | 1845 | | |

## CATALOGUE OF THE GRADUATES OF THE COLLEGE,

*From its Commencement, with the date of their Graduation.*

| | | | |
|---|---|---|---|
| Allen, John C. | 1829 | Dingee, Charles H. | 1826 |
| Brooks, Joseph H. | 1829 | Dawson, Alexander | 1827 |
| Brooks, Edward | 1830 | Dingee, John Henry | 1828 |
| Bringhurst, John | 1832 | Duhamel, Augustine J. L. | 1834 |
| Brown, Samuel W. | 1833 | Douglass, John Wyeth | 1840 |
| Blair, Henry C. | 1836 | Dawes, J. Crawford | 1841 |
| Brooks, Henry | 1838 | Donnelly, Edward | 1843 |
| Babb, Peter | 1842 | Davis, Robert C. | 1844 |
| Baker, Wm. G. | 1842 | Dickson. John | 1846 |
| Boyer, Caverly | 1843 | Ellis, William | 1834 |
| Brodie, Robert C. | 1844 | Evans, Jonathan, jr. | 1835 |
| Baker, Jacob L. | 1846 | Elliott, James L. | 1837 |
| Coggeshall, George D. | 1818 | Estlack, Thomas | 1844 |
| Chapman, William B. | 1834 | England, Robert | 1846 |
| Cockburn, James, jr. | 1835 | Fisher, William R. | 1829 |
| Corse, William H. | 1840 | Guillou Alfred | 1834 |
| Carter, William J. | 1842 | Goodyear, John Y. | 1837 |

Grotjan, P. Adolphe - - 1842
Hathwell, Charles - - 1828
Hendry, Charles D. - - 1830
Hopper, Edward - - 1833
Hansford, William P. - 1833
Husband, Thomas J. - - 1833
Hopkins, James, - - 1835
Hœckly, Benjamin F. - 1837
Hasbrook, William L. - 1837
Harris, Thomas W. - - 1838
Hopkins, Thomas C. - 1839
Haines, Thomas, - - 1839
Jenks, William J. - - 1842
Jones, Daniel S. - - 1843
Jones, Joshua S. - - 1843
Kitchen, William K. - - 1835
Kennedy, Robert J. - - 1837
Knight, William Edwin - 1838
Keeny, Caleb H. - - 1845
Lee, Clement J. - - 1835
Linn, Claudius B. - - 1838
Letchworth, Albert S. - 1840
Leidy, Thomas - - 1845
Lee, Hiram C. - - 1846
McCormick, Charles - 1826
Moore, Robeson - - 1829
Martin, Isaac J. - - 1835
Mitchell, Thomas R. F. - 1837
McKim, Andrew - - 1843
Mitchell, George H. - - 1844
McMakin, Joseph A. - 1845
Needles, Caleb H. - - 1841
Nichols, Wm. St. Clair - 1844
Needles, William N. - 1845
Olmstead, A. J. - - 1835
Ober, Gustavus - - 1837
Pleasants, Charles E. - 1829
Parrish, Dillwyn - - 1830
Powers, Thomas H. - - 1833
Procter, Stephen - - 1834
Price, Richard - - - 1835
Procter, William, jr. - - 1837
Potts, Robert B. - - 1838
Parrish, Edward - - 1842
Patterson, Robert M. - 1846
Patrick, George W. - - 1846
Reeve, Richard M. - - 1832
Rushton, Richard - - 1838
Ritter, Benjamin I. - - 1840
Sharp, William - - 1626
Scattergood, Joseph - 1829
Smith, Franklin R. - - 1829
Smith, Isaac Jones, - - 1830
Simes, Samuel - - 1833
Smith, Ambrose - - 1835
Shreeve, Charles S. - 1835
Simes, John W. jr. - - 1836
Simons, Charles Willis - 1833
Shinn, Walter - - - 1839
Schively, Wm. H. - - 1842
Smith, Jacob - - 1843
Scott, Thomas L. - - 1846
Smith, Benjamin R. - - 1846
Stoever, Charles F. - - 1846
Turnpenny, Joseph C. - 1833
Trimble, David - - 1834
Trimble, Joseph - - 1834
Thomson, Samuel - - 1834
Tilghman, John H. - - 1834
Turner, Joseph M. - - 1836
Turnbull, Lawrence - - 1842
Taylor, Alfred B. - - 1844
Welding, Watson J. - 1833
Worthington, Henry W. - 1838
Woodruff, A. Dickinson - 1838
Wetherill, Samuel - - 1842
Wentz, Silas H. - - 1844
Wiegand, Thomas S. - 1844
Webb, Wm. B. - - 1845
Wright, Peter T. - - 1846
Whartenby, John A. - - 1846